UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SALEM DISTRICT OFFICE
MARYS PEAK RESOURCE AREA

ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT FOR FLAT PEAK MOUNTAIN THINNING

EA NUMBER : OR-080-00-0013 Date: April 10, 2001

PREPARED BY: Phil Sjoding, Interdisciplinary Team Lead

AREA ENVIRONMENTAL COORDINATOR: Belle Smith

Summary: This document is an Environmental Assessment and Finding of No Significant Impact for the proposed Flat Peak Mountain thinning. The project area is located in Township 13 South, Range 7 West, Section 25, Willamette Meridian, Benton County. The land use allocations are both General Forest Management Area and Riparian Reserve.

Alternative 1, the proposed action, would include thinning, density management of riparian reserves, treatment of root rot infected/vine maple covered open areas, reduction of landing logging debris, new road construction, and road renovation and improvement.

The thinning would remove approximately 3968 CCF of timber from approximately 178 acres of 50 to 60 year-old forest. Approximately 111 acres of upland Matrix and 67 acres of Riparian Reserves would be thinned. This action would involve timber harvest using cable skyline and ground-based yarding systems. Approximately 1.55 miles of new road construction is proposed , 1.67 miles for renovation and 2.22 miles for decommissioning. Decommissioning and/or rerouting of short sections of existing motorcycle and bicycle trails which directly impact streams would also be part of the proposal.

Alternative 2 is the "No Action" alternative: proposed actions would be deferred. Forest Management would continue as described in the Salem District Resource Management Plan.

The environmental analysis focuses on the following issues identified through scoping and by an interdisciplinary team of BLM resource specialists:

* Vegetation: Effects on general vegetation, special status, special attention and other plant species and habitats, native plant species and noxious weeds.

* Soils/Fuels: Effects on long-term site productivity. Effects on fuel loading and fire risk. Effects of potential prescribed burning on air quality.

* Water/Riparian: Effects on watershed hydrology, channel conditions, and water quality in the project watersheds. Effects on the impediment and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy.

* Fisheries: Effects on listed fish species and their habitats.

* Wildlife: Effects on special status species, special attention species and wildlife habitats.

* Recreation: Effects on existing recreation resources in the area.

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FINDING OF NO SIGNIFICANT IMPACT

INTRODUCTION

The Bureau of Land Management has analyzed the potential effects of timber harvest, density management and road construction activities in the upper drainages (Township 13 South, Range 7 West, Section 25) of the Marys River and Upper Alsea River Watersheds, Marys Peak Resource Area,. The actions described in the environmental assessment (EA) for the Flat Peak Mountain thinning are proposed for the intent of meeting the need for forest products and forest habitat as described in the *Salem District Resource Management Plan* (RMP, 1995, pp. 1 and 2). The EA is attached to and incorporated by reference in this Finding of No Significant Impact determination.

The Finding of No Significant Impact, the proposal, and associated design features described in the EA will be made available for public review prior to making a decision on the action. The public notice of availability for review will be published in the *Corvallis Gazette Times* of general circulation and through notification of individuals, organizations, and state and federal agencies with affected interests.

Finding Rationale:

Under the alternatives analyzed, significant impacts on the quality of the human environment would not occur based on the following criteria:

1. The alternatives are in conformance with the following documents which provide the legal framework for management of BLM lands in the Marys Peak Resource Area:

Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (S&M ROD, January 2001) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000).

- *Salem District Record of Decision and Resource Management Plan* (RMP, May 1995).

- *Salem District Proposed Resource Management Plan/Final Environmental Impact Statement* (PRMP/FEIS, September 1994).

- *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (ROD, April 1994) and the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (SEIS, February 1994).

The following table shows how this action relates to required components of the Aquatic Conservation Strategy (RMP, pp. 5-7):

Component	Relationship of This Action
Riparian Reserves	Alt. 1 (Proposed Action): Density management and road construction would occur within Riparian Reserves. Roads would be located on stable sites, primarily on ridgetops and would be decommissioned upon completion of harvest.
Key Watersheds	Not in a Key Watershed.
Watershed Analysis	The first iterations of the *South Fork Alsea*, *North Fork Alsea* and *Benton Foothills* watershed analyses were completed in 1995, 1996 and 1997.
Watershed Restoration	Thinning upslope portions of riparian reserves would restore structural diversity and complexity of understory components. New road construction in riparian reserves would be decommissioned after harvest.
ACS Objectives	Effects to resources described in the ACS Objectives (stream physical integrity, water quality, sediment regime, in-stream flows, species composition, etc.) are addressed in the Environmental Consequences section of the EA.

The action would be consistent with the Aquatic Conservation Strategy Objectives and promote development of older forest characteristics in the riparian reserves (See Appendix B-1, "Aquatic Conservation Strategy Objectives Review Summary").

2. .The proposed action and alternatives are in conformance with the ROD/RMP, which describes the general management objectives, land use allocations, and management actions/ direction for BLM-administered lands in the Marys Peak Resource Area

3. The alternatives are consistent with other federal agency and state of Oregon land use plans and with the Benton County land use plan and zoning ordinances. Any permits associated with the implementation of this project would be obtained and requirements would be met.

4. There are no flood plains, or prime or unique farmlands within the sale area.

5. Cultural resources, and paleontological resources were not found in the project area.

6. To comply with Section 7 of the Endangered Species Act (ESA), the Flat Peak Mountain thinning and density management project was submitted for consultation with the USFWS as part of the *Programmatic Biological Assessment of Fiscal Year 2001 projects in the Oregon Coast Province which might modify the habitats of bald eagles, northern spotted owls, or marbled murrelets.* This consultation was concluded with the USFWS issuing a Biological Opinion (BO; tracking number 1-7-00-F-649, August 4, 2000). The BO determined that the level of any anticipated incidental take is not likely to result in jeopardy to the bald eagle, northern spotted owl, or marble murrelet. All applicable Terms and Conditions of this BO have been incorporated as design features of this proposed project.

7 .Consultation with the National Marine Fisheries Service (NMFS) is in progress. The Biological Assessment (BA) which assesses potential impacts to listed fish will be submitted to NMFS during April of 2001.The Letter of Concurrence, responding to that BA is expected in June, 2001. Any decision on the proposed Flat Peak Mountain Thinning would be in compliance with the pending Letter of Concurrence.

8. The proposed action is within the coastal zone as defined by the Oregon Coastal Management Program. This proposal is consistent with the objectives of the program, and the state planning goals which form the foundation for compliance with the requirements of the Coastal Zone Act. Management actions/direction found in the RMP were determined to be consistent with the Oregon Coastal Management Program.

9. No hazardous materials or solid waste would be created in the sale area.

10. The sale area does not qualify for potential wilderness nor has it been nominated for an Area of Critical Environmental Concern.

11. Project design features would assure that potential impacts to water quality would be in compliance with the State of Oregon In-stream Water Quality Standards and thus the Clean Water Act.

12. The smoke generated from burning piles would be within the standards set by the Oregon Smoke Management Plan. This plan considers national air pollution standards and complies with the Clean Air Act.

13. In accordance with the RMP (see pp. 21-22), the amount of late successional forest (i.e., 80 years and older) on federal lands was determined for the Marys River Watershed and the Upper Alsea Watershed. The 80+ forest age classes occur on approximately 37 percent of the federal lands in the Marys River Watershed and on approximately 37 percent of the federal lands in the Upper Alsea Watershed. This exceeds the RMP standard of 15 percent. No late-successional forest stands will be affected by this action.

The actions are local in nature; potential adverse impacts would be short-term. Impacts were determined based on research, observation, professional training, and experiences by the inter-disciplinary team of natural resource specialists. Determining such environmental effects reduces the uncertainties to a level that does not involve highly unknown or unique risks. The design features identified in the EA would assure that no significant site-specific nor cumulative impacts would occur to the human environment other than those already addressed in the Survey and Manage SFEIS, FEIS and SEIS.

Finding of No Significant Impact Determination

Based on the analysis of information in the attached EA, my determination is that a new environmental impact statement (EIS) or supplement to the existing FEIS is unnecessary and will not be prepared. The proposed project would not result in significant environmental impacts affecting the quality of the human environment greater than those addressed in the documents listed above.

MARYS PEAK RESOURCE AREA FIELD MANAGER

April 10, 2001
DATE

Comments regarding this environmental assessment should be received by the Bureau of Land Management, Marys Peak Resource Area by May 14, 2001.

Flat Peak Mountain Thinning
Environmental Assessment
March 2001

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APPENDICES:

I. PURPOSE AND NEED

A. Introduction

The proposed management activities would be located in Section 25, T.13 S.,R. 7 W., W.M., Benton County, within the Marys River and Upper Alsea River watersheds (see General Vicinity Maps in Appendix A-1). The project area is approximately ten miles southwest of the city of Philomath. The actions would occur on lands classified as Matrix and Riparian Reserves in the RMP on pages and 20. The Matrix land use allocation allows for harvesting of trees while retaining important ecological components of forest stands. The Riparian Reserve land use allocation provides for maintaining or enhancing the Aquatic Conservation Strategy Objectives that are listed on pages 5 and 6 of the RMP and Appendix B-2 of this EA.

The action described and analyzed herein is proposed for the purposes of meeting the need for forest products and forest habitat as described in the *Salem District Resource Management Plan* (RMP, 1995, pp. 1 and 2). The proposed project would provide a supply of timber and other forest products that would help maintain the stability of local and regional economies. The proposal would also provide for retention of important ecological components within the forest management area. The project would accomplish road restoration and riparian enhancement in a manner that meets the Aquatic Conservation Strategy Objectives outlined in the Northwest Forest Plan (1994).

The objectives of the matrix thinning is to remove those trees likely to die in the future due to increasing stand densities and to concentrate the sites' productivity on fewer stems, resulting in a higher quality end product. This would be reflected in future higher product value for the public.

Approximately 67 acres of the proposed project is classified as Riparian Reserves as described on page 9 of the RMP. Riparian Reserves are the portions of the watershed required for maintaining hydrologic, geomorphic, and ecological processes that directly affect streams, stream processes, and fish habitats. They are also designed to provide travel corridors and resources for both riparian dependant and other riparian and/or late-successional associated plants and animals.

Both the ROD and the Salem District RMP support thinning young to mid-age Riparian Reserve stands to increase individual tree size. The *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl,(April 1994)* says "Active silvicultural programs will be necessary to restore large conifers in Riparian Reserves. Appropriate practices may include...thinning densely-stocked young stands to encourage development of large conifers..." (p. B-31) The *Salem District Record of Decision and Resource Management Plan, (RMP, May 1995)* directs us to "Apply silvicultural treatments to restore large conifers in Riparian Reserves" (p. 7) and "Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives" (p. 11).

The portion of the proposed project west of road 13-7-36.1 is located in the Upper Alsea River fifth field watershed . The portion of Unit 25A which is west of road 13-7-36.1 is in the South Fork Alsea 6th field watershed, and Unit 25B is in the North Fork Alsea 6th field watershed. The BLM portion of the Upper Alsea River watershed was analyzed in the *South Fork Alsea Watershed Analysis, (SFAWA,* November, 1995*)* and the *North Fork Alsea Watershed Analysis, (NFAWA* July 1996). Both the *SFAWA* (p. 79 and Map 15) and the *NFAWA* (p. 122 and Map 3, p. 155) identify the proposed project area as a potential treatment area. The *North Fork Alsea and South Fork Alsea Watershed Analyses Riparian Reserve Treatment Recommendations Update*, *(RRTRU*, May, 2000), recommend density management after site specific analysis on stands exhibiting characteristics similar to those in the proposed project area (p.5-6 and Table 2, p.7). The watershed lacks large woody debris potential for streams (*SFAWA*, p.65; *NFAWA*, p.70-71) and lacks snags, down wood, sub-canopy layers and species diversity (*SFAWA*, p. 40; *NFAWA*, p. 89)

The portion of the proposed project east of road 13-7-36.1 is located in the Marys River watershed. The BLM portion of this watershed was analyzed in the *Benton Foothills Watershed Analysis, (BFWA*, September 1997), which recommends density management in the Riparian Reserves in the proposed project area, after site specific analysis (p. 125). The watershed lacks Riparian Reserve stands with older forest characteristics (p.64) and large woody debris potential is currently low in the watershed (p.66).

The *BFWA* defines desired vegetation characteristics required for proper Riparian Reserves function as large trees, diverse species of trees and other vegetation, abundant and well distributed mature and understory conifers, mature to late-successional forest characteristics, and large woody debris in the channel and on the flood plain (Appendix 8, p. 178). The Riparian Reserves stands in the proposed project area lack many of these characteristics (p.64).

The goal of this project in the Riparian Reserves would be to begin the development of older forest characteristics. The proposed project as the first stage in this process, would accelerate diameter growth, maintain crown ratios and begin a second canopy layer. Deep crowned limby trees ("wolf trees") would be identified and released from all competition to maintain their characteristics. Understory conifers would be planted in appropriately large openings. These conifers would eventually become a second canopy layer. A small number of CWD and snags would be created immediately. The second stage would occur when the uplands were harvested and would emphasize release of understory conifers, creation of large diameter coarse woody debris (CWD) and snags, and enhancement of variable spacing.

This environmental assessment (EA) is tiered to the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M ROD, January 2001) *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000). The S&M ROD amends a portion of the Northwest Forest Plan by adopting new standards and guidelines for Survey and Manage, Protection Buffers and other mitigating measures.

This environmental assessment (EA) is also tiered to the *Salem District Record of Decision and Re-source Management Plan* (RMP May, 1995) and the *Salem District Proposed Resource Management Plan/Final Environmental Impact Statement* (PRMP/FEIS, September 1994). The FEIS analyzed broad scope issues and impacts within the Northwest Forest Plan's direction to meet the need for forest habitat and forest products (p. 1). The RMP provides a comprehensive ecosystem management strategy for BLM-managed lands in the Salem District in strict conformance with the Northwest Forest Plan and the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (April 1994).

This environmental assessment is also tiered to the *Western Oregon Program-Management of Competing Vegetation Final Environmental Impact Statement* (VMFEIS, February 1989) and the *Western Oregon Program-Management of Competing Vegetation Record of Decision* (August 1992). The VMFEIS analyzed broad scope issues and impacts for an integrated vegetation management strategy consisting of various treatments. The Record of Decision identifies treatments and provides processes to meet vegetation management objectives (p. 3) and resource management goals (p. 33). This EA will analyze vegetation management treatments such as release treatments promoting survival and growth of desired vegetation.

The above documents are available for review in the Salem District Office. Additional information about the proposed Flat Peak Mountain project is available in the Flat Peak Mountain Project EA file.

B. Scoping

Public involvement efforts during the scoping process included the following:

* The general area was shown as Matrix in the Northwest Forest Plan and the RMP. These documents were widely circulated in the state of Oregon and elsewhere, and public review and comment were requested at each step of the planning process.

* A description of the proposal was included in Salem Bureau of Land Management *Project Up-date* issues mailed in September and December of 2000 to more than 1200 individuals and organizations on the mailing list.

* A scoping letter was mailed to adjacent landowners and interested parties on October 13, 2000, requesting identification of issues to be addressed in this EA.

* A news release announcing availability of the EA for public review and comment will be submitted to the *Corvallis Gazette-Times*.

*Copies of the EA are being mailed to individuals, interest groups and agencies.

C. Management Objectives by Land Use Allocation and Resource Program

The objectives listed below can be found on the pages indicated in the RMP.

Matrix (General Forest Management Area, p. 20)

1. Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.
2. Provide connectivity (along with other allocations such as Riparian Reserves) between Late Successional Reserves.
3. Provide habitat for a variety of organisms associated with both late-successional and younger forests.
4. Provide for important ecological functions such as dispersal of organisms, carry-over of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees.
5. Provide early successional habitat.

Riparian Reserves (p. 9)

1. Meet Aquatic Conservation Strategy Objectives
2. Provide habitat for special status/attention and other terrestrial species.

Air Quality (p. 22)

1. Maintain and enhance air quality in a manner consistent with the Clean Air Act and the State of Oregon implementation plan**.**

Water and Soil Resources (p. 22)

1. Comply with state water quality requirements to restore and maintain water quality and to protect recognized beneficial uses in watersheds.
2. Improve and/or maintain soil productivity.

Special Status and SEIS Special Attention Species (p. 28)

1. Protect, manage and/or conserve habitat for these species so as to not elevate their status to any higher level of concern.

2. For this year design timber sales that are a no-affect or a may affect, not likely to adversely affect listed anadromous fish species as defined by the endangered species act.

II. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

A. Introduction

This section describes the proposed action and reasonable alternatives identified by the interdisciplinary team that developed the Flat Peak Mountain Thinning project proposal. Forest management treatments incorporated in the proposed action and alternatives conform with standard practices and general design features intended to reduce the environmental effects of timber harvest and related activities. They comply with the Standards and Guidelines specified in Attachment A of the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (April 1994). Measures are also described in Appendix C, "*Best Management Practices and Timber Production Capability Classification Fragile Code Guidance*" in the *Salem District Resource Management Plan* (May 1995). Copies of these documents can be obtained in the Salem District Office.

B. Alternatives Considered But Eliminated

1) Approximately 200 additional acres within Section 25 were considered for commercial thinning or density management but were deferred for the following reasons:

   * The workload requirements for surveying survey and manage species on the additional acreage.
   * The additional acreage is predominantly located within the Upper Alsea River fifth field watershed. Treatment of this additional acreage may be considered a may affect/ likely to adversely affect under Section 7 of the Endangered Species Act of 1973.
   * The additional 200 acres would add complexity due to the separate harvest system required for harvesting this acreage.

2) Approximately 5 acres (previously identified as Unit 25D in internal ID team memoranda) were considered for commercial thinning but not recommended by the ID Team because after buffering identified survey and manage sites within the unit, it would be impractical to harvest the remaining area.

3) Cutting trees in Riparian Reserves for density management, but leaving all cut trees on the site was considered but not recommended by the ID Team for two reasons:

   * Retention of large amounts of dead wood on the ground would immediately increase the risk of fire as well as the rate of spread and resistance to control. The risk of a fire and the rate of its spread would be highest during the first 1 to 2 years following cutting, and would not return to pre-treatment risk levels for 20 to 40 years. The resistance to control, determined by the amount and size of fuels would remain significantly higher than normal for 15 to 25 years. A high loading of surface fuels would increase the likelihood of fire

spreading upward into the canopy and up into snags, further increasing the difficulty of controlling a wildfire. Consequently, desired structural characteristics such as snags and multi-layered canopies would be at a greater risk of loss.
*Douglas-fir bark beetles are attracted to freshly killed Douglas-fir trees over approximately 8 - 12 inches in diameter. It has been observed that disturbances which produce large numbers of dead trees can cause a population build-up in bark beetles, and result in infestation of adjacent healthy trees. If all cut trees were to remain in the proposed project area, there is a high risk that such an infestation could occur, which could result in killing many of the reserved trees as well as green trees outside the proposed treatment area. Removal of the cut trees would likely greatly reduce this risk.

C. Scoping Issues

The issues listed below concerning the proposed action and alternatives were identified through public scoping and by an interdisciplinary team of BLM natural resource specialists representing various fields of science (see section VI., List of Preparers/Interdisciplinary Team Members). Issues that were considered but eliminated from analysis are documented in Appendix C-1, Environmental Elements Review Summary.

•Vegetation: Effects on general vegetation, special status, special attention and other plant species and habitats, native plant species and noxious weeds.

•Soils/Fuels: Effects on long-term site productivity. Effects on fuel loading and fire risk. Effects of potential prescribed burning on air quality.

•Water/Riparian: Effects on watershed hydrology, channel conditions, and water quality in the project watersheds. Effects on the impediment and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy.

•Fisheries: Effects on listed fish species and their habitats;

•Wildlife: Effects on special status species, special attention species and on wildlife habitats.

•Recreation: Effects on existing recreation resources in the area.

D. Summary of Alternatives

1. Alternative A: The Proposed Action

Commercial thinning in matrix (otherwise known as General Forest Management Areas [GFMA, RMP, p.20]) and density management in Riparian Reserves (RMP, p.11) would be done on approximately 111 and 67 acres, respectively. Trees 60 years old would be skyline yarded on approximately 44 acres and ground-based yarded on approximately 134 acres. Approximately 7300 feet of new road would be constructed. The Project Design Features which follow provide further details.

a. Project Design Features

Project design features are operating procedures that would be included in the design and implementation of the proposed action alternative. They also include measures proposed to mitigate adverse environmental effects. The design features of this proposal are described below. All acres and other numerical units are approximate (See Appendix A-2, Map of Proposed Action and Appendix A-3, Project Design Features Table for the proposed action).

i. Commercial thinning and Density Management

- In units 25A and 25C an average of 67 trees per acre would be reserved. In unit 25B an average of 74 trees per acre would be reserved. This would leave an average basal area of approximately 160 square feet per acre on all units. Suppressed and intermediate trees would be favored for cutting unless the tree is located in an opening and has greater than a 35 percent crown.

- In riparian reserve portions of all units, no trees greater than 24 inches would be marked for cutting. Trees which are 20 to 24 inches (both diameters inclusive) would be marked for cutting only where spacing considerations make it necessary. In the future, approximately 2 trees per acre of the reserved trees are planned to become snags/down wood.

- All trees with complex structures, all plus trees, all existing snags which are greater than 12 inches DBH and all coarse woody debris would be reserved, except for inside road rights-of-way (ROW's) or for safety reasons

- In Unit 25a , Unit 25c, and riparian reserves within Unit 25 B, all species other than Douglas-fir would be reserved, except for road rights-of-way (ROW's) or for safety reasons.

- In Unit 25b, all species other than Western hemlock and Douglas-fir would be reserved, except for rights-of-way (ROW'S), riparian reserves or for safety reasons. In this area,

Western hemlock would be favored over Douglas-fir in the selection of reserve conifers.

- Mature reserved green trees and snags that constitute a safety hazard would be cut and left.

- Only suppressed and intermediate trees would be cut to prevent the creation of openings in the crown canopy when they are within approximately 220 feet of any remnant late-seral tree adjacent to unit 25C

- Trees within one tree length of stream protection zones would be felled directionally (for an explanation of stream protection zones see **vii. Water/Fish/Riparian)**. Where a cut tree does fall within a stream protection zone, the portion of the tree within the stream protection zone would remain in place.

- In riparian reserves, trees which are over 20 inches and which are not marked for cutting which are cut for yarding corridors, or for tail trees would remain in place.

ii. Yarding

- Yarding with ground-based equipment would be restricted to periods of low soil moisture, generally between August 1 and October 15.

- Ground based yarding with either crawler tractors or harvester/forwarders may be done on slopes less than 35 percent.

- Crawler tractor use would require utilization of pre-designated skid trails spaced at least approximately 150 feet apart and the crawler tractors would have a maximum blade width of 96 inches.

- Harvester/forwarder use would require that logs would be transported free of the ground. The equipment would be either rubber tired or track mounted and have rear tires or tracks greater than 18 inches in width. Yarding corridors would be spaced approximately 60 feet apart and be less than 15 feet in width. Logging debris would be placed in yarding corridors in front of equipment to minimize the need for machines to go on bare soil.

- Waterbars would be constructed where they are determined to be necessary by the Authorized Officer.

- With the exception of road right of ways, all yarding would be restricted to periods of low sap flow, generally between July 15 of one calendar year and April 15 of the next.

- Logs would be yarded with a skyline cable system on approximately 44 acres (25 percent of total harvest area) and a ground-based system on approximately 134 acres (75 percent of the total harvest area).

- In the skyline yarding area, one end suspension of logs would be required over as much of the area as possible to minimize soil compaction, damage to reserve trees, and disturbance. Yarding corridors would average approximately 150 feet apart where they intersect boundaries and be 15 feet or less in width. Lateral yarding up to 75' from the skyline, using an energized, locking carriage would be required.

iii. Road and Landing Construction, Road Management

- Approximately 7,300 feet of new road, located predominantly on or near ridge top locations, would be constructed. Where grades are less than 8 percent, out slope roads with no ditches would be constructed. Grades over 8 percent would be constructed with ditches and cross drain culverts may be installed. One of the new roads (F) would predominantly follow an existing motorcycle trail, however as a part of construction a portion of this trail would be rerouted uphill away from a stream. A spur from the existing motorcycle trail that crosses a stream would be closed. (see appendix A-2, "Map of Proposed Action")

- Approximately 6600 feet of proposed new construction would be surfaced in order to provide for all season logging and hauling. Timber hauling seasonal restrictions on any unrocked portion of new construction would be similar to the ground based yarding seasonal restrictions.

- Approximately 9,000 feet of existing road would be renovated. This work may include brushing, blading, brush, minimal excavation, upgrading drainage structures and tree removal or applying rock surfacing.

- In order to limit soil erosion, road construction would be restricted to periods of low precipitation (generally May through October).

- Timber haul would occur out the Beaver Cr. road system in order to reduce potential impacts of sedimentation to the North Fork and South Fork Asea watersheds. Timber hauling would be allowed year-round on rock surfaced roads. In periods of high rain-fall, the contract administrator may restrict log hauling to minimize water quality impacts, and/ or install silt fences, barkbags or apply additional road surface rock.

- Following harvest approximately 6400 feet of new construction (roads A-C, E) and 1100 feet of existing road (road G) would be blocked (decommissioned). This decommissioning may include out sloping for drainage, the construction of waterbars, road surface "scuffing" using a hydraulic excavator and debris piling in order to fully block roads.

- During the same season which harvest occurs approximately 900 feet of new construction (F part) and approximately 2000 feet of existing road F which are used as a motorcycle trail would be decommissioned. Either prior to or following harvest approximately 2000 feet of existing road H which is used as a motorcycle trail would also be decommissioned. Decommissioning would include the construction of waterbars and the piling of debris in

order to narrow the road width and exclude all traffic except motorcycles.

iv. Vegetation

General

- Areas of exposed soil within all new road construction and on ground-based yarding roads and landing locations would be seeded with Oregon certified (blue tagged) red fescue at a rate equal to 40 pounds per acre. The extent of soil disturbance would be determined in cable yarding corridors at the completion of yarding. If warranted for the abatement of any noxious weed infestations, these areas would be seeded.

- g) *Phellinus weirii* (Root rot) infected and vine maple areas which are greater than 1/4 acre in size would be scarified and piled with an excavator. The piles would be covered and burned within the openings. The openings would be planted with western hemlock or other Phellinus resistant seedlings on a 16ft x16ft spacing after site preparation is completed**.**

Survey and Manage

- Management of Survey and Manage Species found as a result of inventories would be accomplished in accordance with the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M ROD, January 2001) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000).

- **Species located in the project area that have been removed from Survey and Manage Protection Buffers and Protect from Grazing in All or Part of their Range (Table 1-2, January 2001, Survey and Manage Standards and Guides) :**

  Loxospora corallifera, Lobaria oregana, Lobaria pulmonaria, Pseudocyphellaria anomala, Pseudocyphellaria anthraspis, Pseudocyphellaria crocata, Antitrichia curtipendula, Cantharellus formosus, Sarcosoma mexicana, Otidea onotica, Ulota megalospora, Ptilidium californicum

  No special management is required for these species.

- **Category B Species located in the project area (Table 1-1, January 2001, S&M S&G)**

  Phaeocollybia sipei, Phaeocollybia olivacea, Phaeocollybia pseudofestiva and Phaeocollybia spadicea,

Management of these species would be accomplished as known sites as stated on page 9 of the *S&M S&G* for these species. This would mean protecting these sites by including them in areas which are withdrawn from the proposed harvest area.

Ramaria araiospora, Cortinarius cyanites and Gomphus clavatus

Management of these species would be accomplished as known sites as stated on page 9 of the *S&M S&G* for these species**.** This would mean protecting these sites with a 50-foot radius, no-entry buffer.

- **Category D species located in the project area (Table 1-1, January 2001, S&M S&G)**

Phaeocollybia. fallax

This species was located both outside the current proposed harvest area and hence complies with known site management as stated on page 12 of the *S&M S&G.*

v. Soils/Fuels

- Soils management design features are listed under the Yarding and Roads sections.

- Landing slash would be piled with a hydraulic loader. Piled landing slash and piles created from vine maple/phellinus patches (see **iv. Vegetation**) would be covered in late summer, and burned in the fall under favorable smoke management conditions.

- In order to mitigate fire risk the area would be monitored for the need of closing or restricting access during periods of high fire danger. During the closed fire season the first year following harvest activities, while fuels are in the "red needle" stage, the entire area would be posted closed to all off road motor vehicle use.

vii. Water/Fish/Riparian

- Approximately ¼ acre of a hardwood overstory and conifer understory forest (Reference conifer release area as shown on Appendix A-2 Map of Proposed Action) would be thinned by cutting the hardwood overstory. The conifer understory trees would not be cut. The cut hardwood trees would be left in order to block a short section of existing motorcycle/bicycle trail which crosses a stream. The short spur motorcycle trail which crosses the stream would also be blocked with waterbars and debris.

- Stream Protection Zones would be established along all streams and identified wet areas within the harvest area. These zones would include areas along streams which would be withdrawn from harvest due to logging feasability problems and other areas along all

streams which would be identified as "No Cut Stream Buffers." (Reference Appendix A-4 Criteria for Identifying "No Cut Stream Buffers") To protect water quality, trees would be felled away from all stream protection zones within the harvest area. Where a cut tree does fall within a stream protection zone, the portion of the tree within the stream protection zone would remain in place.

- No cutting or yarding. would be permitted in or through all stream protection zones within the harvest area.

- Approximately three years after timber sale completion, the size and condition of CWD and snags within riparian reserves would be evaluated. Where appropriate, approximately 2 trees per acre of average or larger diameter breast height (DBH) size class would be cut and left in place.

- Approximately 4 conifers per acre (4 trees per 900-1700 feet of stream) would be cut and left in or adjacent to all streams in the project area, immediately after the sale is completed. It is expected that these trees would come from inside or very close to the stream protection zones, and would only be cut where sufficient conifers occur along that portion of the stream. Conifers cut would be equal to or larger than the average stand diameter. Additional trees could be cut and placed in streams in the project area at the same time that additional upland CWD is created (approximately 3 to 4 years after the sale). Numbers of logs placed in or near streams at that time would be determined by the fisheries biologist and subject to guidelines established for the Siuslaw National Forest for minimizing bark beetle infestation (Appendix B-2). Both projects would be accomplished by BLM personnel or service contract, and subject to funding.

- Other Water/Fish/Riparian design features are listed under section **iii. Road and Landing Construction, Road Management**.

viii. Wildlife

Special Status Species

- The operation of power machinery would be restricted on Unit 25C to outside of the critical nesting season (March 1 to August 5) for spotted owls and marbled murrelets. Daily operations of power equipment on Unit 25C would be restricted to the time periods of two hours after sunrise to two hours before sunset, for the period of July 1 to September 15.

- Within 220 feet of any remnant late-seral tree adjacent to unit 25C only suppressed and intermediate trees would be cut to prevent the creation of openings in the crown canopy.

Survey and Manage

- Management of Survey and Manage Species found as a result of inventories would be accomplished in accordance with the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M ROD, January 2001) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000).

Species located in the project area that have been removed from Survey and Manage Protection Buffers and Protect from Grazing in All or Part of their Range (Table 1-2, January 2001, Survey and Manage Standards and Guides)

Papillose Tail dropper

- No special management is required.

Category C Species located in the project area (Table 1-1, January 2001, S&M S&G):

Red Tree Vole

- Inventory for the Red Tree Vole would be accomplished in accordance with the requirements stated on page 11 of the S&M ROD>

- Management of this species would be accomplished in accordance with IM-OR-2000-086, *Management Recommendations for the Oregon Red Tree Vole Arborimus longicaudus, Version 2.0*). On this project area this would mean that if any nests are found they would be protected with a 10 acre buffer.

ix. Recreation

- Existing trail use would be maintained unless precluded by aquatic conservation or endangered fisheries concerns. Specifically, as described under **vii. Water/Fish/Riparian** a short trail which crosses a stream within the conifer release area would be closed by residual cut hardwoods and would be closed by waterbars and debris**.** Also, in conjunction with the construction of road "F" a portion of trail will be rerouted upslope from a stream.

x. Summary of Seasonal Restrictions

The following is a summary of seasonal restrictions:

Management Activity	Rationale	**No Activity Between these Dates**
Falling, yarding	Bark Slippage	April 15 to July 15
Road Construction	Soil Erosion	October 1 to May 1
Ground-based yarding,	Soil Compaction	October 15 to August 1
Power machinery use on Unit 25A	Marbled murrelets	March 1 to August 5

4. Alternative 2: No Action

Thinning and density management and mitigation of sedimentation caused by the existing motorcycle trail would be deferred to a later date.

COMPARISON OF ENVIRONMENTAL CONSEQUENCES, BY ALTERNATIVE, FOR IDENTIFIED ISSUES

Issue	Alternative 1	Alternative 2
Vegetation	Road construction would result in the removal of vegetation on the five acres and removal of mineral soil on the actual road grade. Vegetation would be removed and soil disturbed in openings planned for stand conversion; however, these area are less than an acre each so that the disturbance would be minimal. Thinning approximately 178 acres would decrease the percent canopy cover in the project area in the short term. A decease in the canopy density would increase the amount of available sunlight to the canopy and forest floor, resulting in accelerated growth to the reserved conifers, hardwoods, shrubs, and forbs within the project area. Some of the reserved species maybe damaged through logging and road construction activities. No significant impact to the residual stand is anticipated however, older forest characteristics for reserved wildlife trees and improved wood quality on leave trees planned for future harvest are expected to be achieved earlier within the stand through thinning. (See Silvicultural Prescription in EA file)	Stands needing treatment would be deferred, resulting in a loss of late-successional forest or timber stand enhancement.

Soils	Residual compaction within RMP standards.	Continuation of current conditions.
Water/Riparian/ Fish	This proposal is unlikely to impede and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy (ACS). Over the long term this proposal should aid in meeting ACS objectives by speeding the development of older forest characteristics in the riparian zone Development of desired riparin stand characteristics would be accelerated The proposed action would have no measurable adverse impacts to local fish and fish habitat. Habitat and channel conditions are expected to be maintained. Impacts may occur due to small inputs of sediment, but would be short term (a year or less).	Continuation of current conditions. No effects to aquatic ecosystem.

Wildlife	No significant impacts to Northern spotted owl or Marbled murrelet habitat. The proposed project is considered a "may affect, not likely to adversely affect" on northern spotted owl and marbled murrelets for noise disturbance during the breeding season to unsurveyed suitable nesting habitat adjacent to unit 25C if any activities occur from August 6 through September 30. Thinning could abbreviate the recruitment time necessary for development of larger (greater than 20") hard snags, CWD, and for the development of a more complex overall stand structure.	Continuation of current habitat conditions and trends.

III. DESCRIPTION OF THE AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES

The following descriptions are the environmental features affected by timber harvest and associated activities and the environmental consequences which would result from implementing the alternatives. (This information is summarized in Appendix C-1.) If there are no anticipated site-specific impacts, if site-specific impacts are considered negligible, or if the cumulative impacts described in the PRMP/FEIS are considered acceptable, then resource values are not described in this section. A documentation of "no effect" to resources where review is required by statute, regulation, or executive order is included in Appendix C-1. (See *BLM Manual*, Sec. 1790, Appendix 5.)

A. General

The proposed project area is located in T. 13 S., R. 7 W., Section 25, in Benton County. The action falls within the Benton Foothills, North Fork Alsea and South Fork Alsea Watershed Analysis Areas. The land use allocation for the proposed project area is Matrix (GFMA) and

Riparian Reserve.

B. Topography

The project area is located on multiple aspects on slopes generally ranging from 5 to 60 percent. Elevation varies from 2000 to 2,400 feet above sea level.

C. Vegetation

Issue: Effects on general vegetation, special status, special attention and other plant species and habitats, native plant species and noxious weeds.

Vegetation: Affected Environment

General Vegetation

The plant community or the closest approximation is Douglas-fir/Red Alder/Vinemaple (D/RA/VM) (Franklin and Dyrness (1973) (Chapter 3-pp.29-31 RMP). The main stand (Units 25 A, C and D) consists of a uniform single layer canopy of 60 year old Douglas-fir stand with scattered western hemlock and hardwoods. The average relative density for the stand is 54 percent. The canopy closure averages 80 percent. The high relative density and canopy closure indicate the stand is overcrowded The average crown ratio for these stands is 35 percent on dominant and co-dominant trees. The average diameter breast height (DBH) is 17 inches. Common species found in the under-story were vinemaple, salal, and swordfern. Moss was also commonly present at under-story plots. Approximately 3600 feet per acre of coarse woody debris (CWD) per acre over five inches diameter breast height (DBH) was found during the 1996 forest survey. Most CWD is in classes 3, 4 and 5. The stand has an average of 130 green trees and 78 snags per acre. This is an indication that the stand is beginning to self thin.

Unit 25B is a single layer canopy 55 year old Douglas-fir stand with a 40 percent component of western hemlock located in clumps throughout the ten acre stand. The average relative density for the stand is 78 percent. The canopy closure averages 81 percent. High relative density and canopy closure indicate the stand is overcrowded. The average crown ratio for this stand is 35 percent on dominant and co-dominant trees. The average DBH is 14 inches. Common species found in the under-story were salal and vinemaple. Bare soil was present on most of the under-story plots. Approximately 5400 feet per acre of coarse woody debris (CWD) per acre over five inches diameter breast height (DBH) was found during the 1996 forest survey. This stand has 260 live stems and 47 snags per acres. This is an indication that the stand is beginning to self thin. (See silvicultural prescription in EA file)

Noxious Weeds

The following noxious weeds are known from or adjacent the project area, Tansy ragwort (*Senecio jacobaea*), bull and Canadian thistles (*Cirsium vulgare* and *C. arvense*), St. John's wort

(*Hypericum perforatum*) and Scot's broom (*Cytisus scoparius*).

Special Status Species (See RMP p.28)

There are no "known sites" of any special status vascular plant, bryophyte, fungi or lichen species within the project area nor were any found during subsequent surveys.

Survey and Manage

(See botanical report in EA file)

Fungi

Inventory of the project area was accomplished in accordance with *Plan Maintenance Documentation: Decision to Delay the Effective date for Surveying 7 "Survey and Manage" and Protection Buffer Species (*March 8, 2000). Specific survey's were accomplished on July 27, August 3, 11, 16, 23, Sept 7, 1999 and October 3, 10, 24, November 7, 13, 2000.

Cortinarius cyanites, Gomphus clavatus, Phaeocollybia sipei, *Phaeocollybia olivacea*, *Ramaria araiospora*, *Phaeocollybia pseudofestiva*, *Phaeocollybia spadicea*, were found in the proposed project area. These species are *Category B* as depicted in Table 1-1 of the S&M ROD.

Phaeocollybia fallax was found in the proposed project area. *Phaeocollybia fallax* is included in *Category D* as depicted in Table 1-1 of the S&M ROD.

Otidea onotica was found in the proposed project area. *Otidea onotica* is included in *Category F* as depicted in Table 1-1 of the S&M ROD.

Cantharellus formosus and *Sarcosoma mexicanum* were found in the proposed project area. These species have been removed from Survey and Manage as depicted in Table 1-2 of the S&M ROD.

Vascular Plants

Inventory of the project area was accomplished in accordance with the survey protocols as spelled out in *IM OR 99-026* dated January 20, 1999. Specific survey's were accomplished on July 27, August 3, 11, 16, 23, Sept 7, 1999 and October 3, 10, 24, November 7, 13, 2000.

No Survey and Manage vascular plants were found on the project area

Lichens

Inventory of the project area was accomplished in accordance with the survey protocols as spelled out in *IM OR 98-038* dated March 12, 1998. Specific survey's were accomplished on July 27, August 3, 11, 16, 23, Sept 7, 1999 and October 3, 10, 24, November 7, 13, 2000.

Loxospora corallifera, *Lobaria oregana*, *Lobaria pulmonaria, Pseudocyphellaria anomala, Pseudocyphellaria anthraspis and, Pseudocyphellaria crocata* were found in the proposed project area. These species have been removed from Survey and Manage as depicted in Table 1-2 of the S&M ROD (January 20010.

Bryophytes

Inventory of the project area was accomplished in accordance with the survey protocols as spelled out in *IB OR 98-051* dated December 11, 1997. Specific survey's were accomplished on July 27, August 3, 11, 16, 23, Sept 7, 1999 and October 3, 10, 24, November 7, 13, 2000.

Antitrichia curtipendula and *Ulota megalospora* were found in the proposed project area. These species have been removed from Survey and Manage as depicted in Table 1-2 of the S&M ROD.

Vegetation: Environmental Consequences

Alternative 1 (Proposed Action)

General Vegetation

New construction of five roads (7,200 feet) totaling approximately five acres would be constructed. Road construction would result in the removal of vegetation on the five acres and removal of mineral soil on the actual road grade. Vegetation would be removed and soil disturbed in openings planned for stand conversion; however, these area are less than an acre each so that the disturbance would be minimal.

Thinning approximately 178 acres would decrease the percent canopy cover in the project area in the short term. A decease in the canopy density would increase the amount of available sunlight to the canopy and forest floor, resulting in accelerated growth to the reserved conifers, hardwoods, shrubs, and forbs within the project area. Some of the reserved species maybe damaged through logging and road construction activities. No significant impact to the residual stand is anticipated however, older forest characteristics for reserved wildlife trees and improved wood quality on leave trees planned for future harvest are expected to be achieved earlier within the stand through thinning. (See Silvicultural Prescription in EA file)

The majority of the trees to be thinned are suppressed and co-dominant conifer trees. These trees would be removed and utilized in the wood product industry. Removal of suppressed trees will reduce the number of small diameter CWD in the next ten to twenty years, but will also reduce favorable conditions for insect infestation and disease in the stand. Desirable snags and CWD>20 inches diameter are expected to accrue in both stands as leave trees grow.

Special Status Species

The proposed action would not effect any special status plant, species since none were found or are known from the project area.

Survey and Manage

All survey and manage species that require protection under the S&M ROD would be protected as originally intended in the Salem District RMP. This would provide species outcomes equal to or greater than the prior strategy for the affected species (S&M ROD p.6) covered by the S&M FSEIS at less cost. In addition, although not required, the *Ptilidium californicum* location (bryophyte) would be protected from all timber harvesting activities, Its' location is in an area which is withdrawn from harvest for other reasons. Protection of S&M species would be in full compliance with the S&M ROD

Noxious Weeds

Any ground disturbing activity may lead to an increase in the noxious weeds present in the project area. These species are priority III noxious weeds and are well established and widespread throughout the Mary's Peak Resource Area and the Salem District. Eradication is not practical using any proposed treatment methods. Grass seeding exposed soil areas tends to abate the establishment of noxious weeds. Adverse effects from noxious weeds are not anticipated. The risk rating for the long-term establishment of noxious weed species and consequences of adverse effects on this project area is low.

Alternative 2 No Action (Deferred Treatment)

General Vegetation

No vegetation would be disturbed in the proposed road construction or stand conversion areas. This process would be slow compared to Alternative 1 and the upland stand would not reach growth and health conditions desired. The sparse ground cover and dense canopy conditions would remain until the stand self thinned as the crown canopy closed over time, creating small diameter CWD in the short term and eventually openings in the canopy. This would increase the light level in the stand thus increasing ground and shrub growth. The stand would have less vertical structure, poor height to diameter ratio and low crown ratios than the managed stand due to the past crowded stand conditions. The residual trees would not be as vigorous as the managed stand with reduced crowns size. This process would occur more slowly in the unthinned stand than in a thinned stand, and the stand would not attain the desired tree diameter, crown and wood quality for GFA objectives or high quality wildlife trees and CWD The open area would continue to be brush patches and not provide vertical structure or trees in the near future. (See Silvicultural Prescription in EA file)

Special Status Species

Not affected

Survey and Manage

No survey and manage species would be affected under this alternative. Natural succession would continue through this stand.

Noxious Weeds

Without any new man made disturbances in the proposed project area the established noxious weed populations would remain low.

D. Soils

Issue: Effects on long-term site productivity.

Soils: Affected Environment

The predominant soil series on and around these sites are: Bohannon gravely loam and Slickrock gravelly loam (units 25A and 25B), and Preacher clay loam (unit 25C). Slopes on the majority of the sites varies from flat to 40 percent with some inclusions of short side slopes up to approx. 60 percent. Moderate to severely compacted soils have persisted in many of the existing skid trails that date back to the original tractor logging of the site in the 1940's. There is some brush growing in most of the trails. Large trees are present mostly along the edges of the trails, very few large trees are growing in the trails themselves. The skid trails are generally under 10 feet in width so the stands are generally fully occupied by tree canopies.

Bohannon soils are well-drained, moderately deep soils that formed in colluvium weathered from arkosic sandstone. They are found on Coast Range sites at elevations from 100 to 3500 feet. Slopes range from 25 to 75 percent. Typically, the surface soil is a very dark-brown and dark brown gravelly loam about 18 inches thick. The sub-soil is a dark brown gravelly loam about 17 inches thick. It is underlain by fractured arkosic sandstone bedrock at a depth of about 35 inches.

Slickrock soils are well-drained, level to very steep soils formed in alluvial and colluvial materials derived from sandstone. They are found on Coast Range sites at elevations of 250 to 2500 feet. The surface layer is a very dark brown gravelly loam about 7 inches thick. The sub-surface soil grades to a dark yellowish-brown very cobbly clay loam at a depth of 23 to 55 inches where it contacts slightly weathered sandstone.

Preacher soils are deep, well-drained, soils that developed in alluvial and colluvial material derived from sandstone. They are found on nearly flat to steep sloped Coast Range sites at elevations from 250 to 2500 feet. Typically, the surface soil is a very dark brown or dark brown clay loam about 28 inches thick. Pebbles make up about 10 percent of this layer. The underlying material is a yellowish-brown sandy loam about 18 inches thick. Weathered sandstone is at depth of about 60 inches.

In general, on the benches, moderate slopes and broader, more stable ridges with slopes ranging from 0 to 40 percent the soils are deep gravely loams and loamy clays with thick top soils. As the slopes steepen, the soils begin to change to moderately deep gravely loams with thinner top soils. With increasing slope over 70-80 percent, the surface soil becomes less stable and is subject to dry raveling when the vegetation and litter layer is removed. Steeper areas will be excluded from the project for the most part. Any activity on these steeper areas would only involve removal of a few trees leaving the majority of the vegetation and litter layer intact. No dry ravel problems would occur from this type activity.

There is evidence of old tractor skid roads scattered through out the project area probably dating back to the original tractor logging of the sites in the 1940's. Moderate and highly compacted soils persist in many of the existing skid trails. There is some brush growing in most of the trails. Large trees are present mostly along the edges of the trails, very few large trees are growing in the trails themselves. The skid trails are generally under 12 feet in width so the timber stands are generally fully occupied by tree canopies.

All of the soils on the project area are formed on sandstone. These are highly productive sites and vegetation rapidly re-establishes following disturbance. Competition for light by hardwood brush and trees can inhibit conifer establishment on these sites. Nearly all of the area is well drained. There are some minor inclusions of less well drained, moister sites lower down at the bottom of some slopes or lower bench areas. These areas should not be a problem to work around.
There are two management concerns with these soils: the potential for compaction and the potential for surface erosion.

Due to the substantial amount of clay and silt size particles in these soils, they easily compact when moist or wet and subjected to pressure from heavy equipment, dragging logs etc. Once compacted, fine textured soils are very slow to recover, as is evidenced by the existing compaction on site, dating to the 1940's. Compaction of the soil can reduce site productivity by limiting / restricting root growth in the compacted soil as well as limiting movement of O_2 , CO_2 and H_2O into, out of and within the soil. Depending on the extent and degree of compaction, some reduction of site productivity can be expected. In addition to reduced site productivity, on compacted steeper sites (>35 percent), the reduction in the water infiltration rate can result in rapid rates of surface water accumulation and run off. On bare soil the hazard of erosion can be high. Minimizing compaction of soils in the project area and maintaining vegetation and litter on the soil surface should be a high priority, especially on the steeper areas. Since most of the proposed project site has slopes between 10 percent and 30 percent and most vegetation will remain, the risk of surface erosion is expected to be minimal. The major soils concern is the potential reduction of site productivity due to compaction.

Soils: Environmental Consequences

Alternative 1 (Proposed Action)

Roads

Constructing 7200 feet of new road would result in loss of top soil and compaction of soil on approximately 2 acres of forested land, (slightly more than 1 percent of the total project area).

New impacts to soils and fuels in the areas where the roads will be renovated should be minimal since these areas have already been developed in the past and the compacted surfaces already exist. Some vegetation will be cleared and scattered along the R/W's and this will add minimally to the slash that would be created when the project area is treated.

In the short term, the blocking or decommissioning of 2.5 miles of existing road would result in the loss or damage of some established vegetation on the roads that were not already opened up for the thinning project (about 1.5 miles). The vegetation at risk is primarily shrubs, grasses and a few small trees (mostly alder). The roots and stems of much of this vegetation would remain in the soil and would likely re-sprout and continue to grow, stabilize and improve the soil structure in the long term. On some of the roads, the vegetation would not be disturbed at all. Areas where soil is ripped or loosened would be replanted. Root and plant growth in the loosened soil areas should be better distributed and more vigorous resulting in accelerated improvement of soil structure. Water bars, out sloping, seeding and blocking access are all measures that would result in reduced surface erosion and runoff.. There would be a small, short term increase in the amount of exposed soil resulting from several of these actions. However, these road treatments, would greatly accelerate recovery back to a forested condition compared to leaving the roads in the present condition. As shown on the table in Appendix A-3, because of the decommissioning, there would be an overall decrease of approximately 5,100 feet of road following the completion of project. Short term increases in surface erosion from these activities are expected to be very slight and would decrease once revegetated.

Restricting motor vehicles into portions of the project area by blocking / closing roads, would reduce the risk of human caused fire starts. Closing roads has the negative effect of also reducing access by fire vehicles and personnel in the event of a fire. However, in this area of Oregon, most fires are human caused, so restricting entry should result in lower overall risk of loss by fire.

Logging:

Impacts would vary depending on how much of the total project area is skyline yarded verses ground -based yarded. For the ground based portions, impacts would depend on whether a harvester / forwarder system or crawler tractors are used, how dry the soils are when heavy equipment operates on them and how deep the soils are covered with slash in the yarding roads during logging operations. Impacts also include the additional area used for landings. For many of the landings, a portion of the existing haul road or the harvest road is used for equipment to operate on. Some additional ground adjacent to the road surface is used to turn equipment around on and to deck logs until transport. The degree of soil disturbance and compaction in areas where logs are sorted or decked is expected to be low. Areas where equipment turns or backs around on multiple times will experience heavy compaction and disturbance to the top soil layer. Soil

impacted by skyline yarding roads, (about 3 percentof the skyline area) usually results in light compaction in a narrow strip <4 feet in width. This is especially true for this type of project where logs are relatively small and there would be adequate slash on the ground in the corridors to yard over. Affect on site productivity from this type of disturbance is minimal compared to compacted tractor or forwarder haul roads.

Compaction and disturbance/displacement of soil:

Harvester/Forwarder

If harvester / forwarder system is used for the entire ground-based portion of the project area, the percentage of total unit area impacted by surface disturbance and soil compaction as a result of : landing construction would be approximately 1 percent (1ac.); from harvester / forwarder yarding roads approximately 2 to 8 percent (3 to 11 ac.). Approximately 3 to 9 percent (4 to 12ac. of the total area would be affected. Very little or no top soil loss should occur, except at landings.

Crawler/Tractor

If yarding is done using crawler tractors for the entire ground-based project area, the percentage of total unit area impacted by surface disturbance and soil compaction as a result of : landing construction would be approximately 1.5 percent (2.25 ac.); from tractor yarding roads approximately 7 to 8 percent (9 -11 ac.). Approximately 9 to 10 percent (11-13 acs.) of the total area would be affected. Expect a moderate amount of top soil loss (displacement) to occur in yarding roads and higher amounts of displacement at landings.

Some of the potentially impacted acreage listed above, includes already existing, compacted skid roads from previous logging in the 1950's. These existing roads will be used as much as practical when marking locations for harvest roads for this project. As a result, the amount (acreage) of ***new or additional*** harvest impacts will be less than the totals listed above, while the total area of impacted ground is expected to be within the total ranges listed.

The severity of compaction can be mitigated some what when slash and small logs are left in the skid roads and the total number of passes is low (less than 6). With tractor skidding it is much harder to keep slash and debris on the skid roads for more than a few passes, so additional effort would be needed to replace slash and debris back onto skid roads. Operating only when soils are dry and soil strength is high would help to reduce the amount of crushing of individual soil aggregates and resulting compaction. Multiple passes on moist or wet soil usually results in rutting and heavy compaction.

For the entire project area, the **cumulative acreage** of soil disturbance from past and present activities (roads and logging) are estimated to be:

(If the maximum acreage is tractor yarded): 17 - 20 acres (9 ½ % - 11 %).
(If the maximum acreage is harvester/forwarder yarded): 8-16 acres (4 ½ % - 9 %)

(If the entire acreage is cable yarded): 9 - 11 acres (5 %- 6 %)

Following logging, approximately 3 acres of road surface (1 ½ percent of total project area) would receive one or more mitigating treatments to block or decommission portions of the roads. Although not totally restoring the soil, these treatments will partially mitigate some of the negative soil impacts thus reducing the total cumulative impacted acres listed above.

Following completion of the project, the most impact possible would be approximately 10 percent of total acreage with some level of unmitigated soil compaction / disturbance. The Salem District RMP lists 10 percent as the maximum acceptable level of aerial extent for soil disturbance / compaction.

Site Productivity:

Harvester/forwarder

For harvester / forwarder systems. If the suggested design measures are followed: (soils are fairly dry and equipment operates on an adequate layer of slash), soil impacts in harvest roads would result in light to moderate compaction in two discontinuous, narrow strips less than 3 feet in width. The trees in the project area have ample crowns, so there should be adequate slash on the ground to yard over. The affect on overall site productivity from light to moderate compaction on less than 9 percent of the total area would be low (probably less than 2 to 3 percent reduction in yield).

Crawler/Tractor

For tractor yarding. If the suggested design measures are followed: (soils are dry (less than 25 percent m.c.) and equipment operates on some slash), soil impacts would result in moderate, fairly continuous compaction within the main 8to10 foot wide yarding roads. Impacts would be moderate to heavy in the landing areas and light to moderate on less traveled portions of yarding roads. The affect on overall site productivity from mostly moderate compaction on 10 percent of the total area would be less than 4 percent reduction in yield).

Cable Yarding

For skyline yarding. The effect on overall site productivity from light compaction on 3 percent of the area plus moderate to heavy compaction at the landings less than 1 percent, would be negligible to perhaps 1 percent.

Alternative 2 (No Action)

No additional compaction or disturbance would take place on the project area.

E. Fuels

Issues: Effects on fuel loading and fire risk. Effects of potential prescribed burning on air quality.

Fuels: Affected Environment

The proposed project area is presently occupied by fairly continuous stands of second growth Douglas fir timber with varying minor components of western hemlock, Western red cedar, bigleaf maple and red alder trees. Stand ages average about55to60 years of age. Undergrowth is a moderate growth of: salal, Oregon grape, vine maple, ocean spray and huckleberry. There is a moderate accumulation of dead woody material on the ground. Small snags are scattered through the stand. Large snags (over 20 inches dia.) are less than 2 per acre. Based on visual estimates, using USDA FOREST SERVICE GENERAL TECHNICAL REPORT PNW-105 (May 1980), series 1-DF-4 and 3-DFHD-3, the estimated total dead fuel loading for these stands is in the15 to 20 tons per acre range. Fuel model for these sites would be model 8 - closed timber litter.

The proposed project area is approximately 6 to 7 miles from the Willamette Designated Area at an elevation of approximately 2000 feet.

Fuels: Environmental Consequences

The increase in slash created by the proposed thinning will result in a higher risk of fire on the thinned sites following logging. The increase in fuel loading is expected to be 5 to 15 tons per acre with a discontinuous arrangement. Total dead fuel loadings will range from approximately 15 to 35 tons per acre. The highest fuel loadings will be scattered through the site depending on the distribution of trees cut with the various prescriptions. The fuel model will shift from Model 8 to model 10 or 11. The overall the risk of fire following this action will be moderate. This is due to the moderate topography, the isolated nature of the most of the slash from the roads, the continued existence of a tree canopy shading the fuels, and the higher associated humidity.

Risk of fire will be greatest during the period when attached needles dry out the first season following cutting. These “red needles” generally fall off within one year and fire risk greatly diminishes. Fire risk will continue to diminish as the area greens up and the fine twigs and branches begin to break down. Burning of landing piles and slash concentrations along roads will reduce risk of a fire start from human ignition sources.

Burning will be done in the Fall under good atmospheric mixing conditions, threat of impacting air quality in designated areas will be very low. Any residual smoke should be of short duration and occur during a period of the year when there is less outdoor activity.

F. Water

Issues: Effects on watershed hydrology, channel conditions, and water quality in the project watersheds. Effects on the impediment and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy?

Water: Affected Environment

Project area climate, hydrology and geology-

The project area is in the headwaters of two fourth field watersheds: the Alsea River and the Upper Willamette. There are three stream systems draining the project area: Peak Creek in the South Fork of the Alsea river; Ernest Creek in the North Fork of the Alsea river (both part of cataloging unit #1710020501 U.S.G.S., 1974); and Oliver Creek in the Muddy Creek watershed, cataloging unit #1709000305 (U.S.G.S., 1974).

The project area receives approximately 85 inches of rain annually and has a mean 2-year precipitation event of 5.0 inches in a 24-hour period (N.O.A.A. Precipitation-Frequency Atlas for Oregon, Volume X). Most runoff is concentrated in the winter months during storm events associated with low pressure "frontal" systems moving inland from the southwest off the Pacific Ocean. Peak stream flow events are concentrated in the months of November through March when Pacific storm fronts are strongest. As a result of little or no snowpack accumulation and infrequent rainfall, stream flow in the summer is typically a fraction of winter levels and many headwater channels retreat to subsurface flow. At a distance of over 25 miles from the ocean, fog and fog drip are not significant contributors to watershed hydrology in the project area.

Elevations in the project area range from 2000 to 2,500 feet. While snowpack accumulation in the Oregon Coast range is unusual, this elevation range is in the transient snow zone and subject to rain on snow events (ROS). ROS events have the potential to increase peak flows during winter or spring storms and are associated with most of the large floods observed over the last fifty years in the Pacific Northwest.

The streams in the project area drain Flat Peak Mountain in a concentric pattern. Flat peak is capped by resistant intrusive rocks; primarily gabbro and diorite, so called "mafic intrusives"(Walker, et al., 1991). Slopes on these surfaces are generally from low to moderate gradient and stable; most of the project area lies on these surfaces.

Steep slopes subject to mass wasting have formed at the eroding edge of the resistant bedrock capping Flat Mountain. Headwater streams in this material are prone to debris torrents. Beneath the mafic intrusives lie Tyee formation marine sedimentary rocks. At the contact between the intrusives and the Tyee a zone of poor stability sometimes occurs. Small portions of this zone are characterized by slump prone hill-slopes and deeply incised streams with poor bank stability. Areas adjacent to streams which exhibit moderate to poor slope stability have been excluded from

the project area.

Project area stream channels

Small tributary channels, mostly with an ephemeral or intermittent flow regime, predominate in the project area. These are Rosgen type "A" channels: greater than 10 percent gradient, entrenched, low width/depth ration, low sinuosity. Reflecting their colluvial natural (dominated by hill-slope geomorphic processes) channel substrates are predominately in the small gravel to sand size classes. All of these channel types viewed in the project area are vegetatively stabilized (i.e., the vegetation in channel and on the banks is the predominate stabilizing element) and currently in "proper functioning condition" (U.S.D.I., 1998). None of the channels in the project area are currently functioning at risk or non-functional; none of the channels exhibit indications of instability (i.e., high rates of bank erosion and sediment transport, "nick points", etc.).

The main upper Oliver Creek channel, the only perennial channel in the project area, is primarily a Rosgen type "B4" channel: 2 to 4 percent gradient, moderately entrenched, low width/depth ration, low sinuosity. Reflecting its colluvial natural, channel substrates are predominately in the small gravel to sand size classes. This channel was viewed in the field and is vegetatively stabilized (i.e., the vegetation in channel and on the banks is the predominate stabilizing element) has low levels of bank erosion and appears to be in "proper functioning condition" (U.S.D.I., 1998).

Project area water quality and beneficial uses

Fine sediment and turbidity

Occasional turbidity grab samples have been collected since 1995 during winter storm events lower in the two project area watersheds. Lower Peak Creek NTU levels ranged from a low of 1.5 to a high of 54 with a median value of 7. A reading of 66 NTU's on Upper Peak Creek was collected below a blown-out beaver dam during the 1996 flood. However, this level of turbidity was short-lived and does not represent normal winter conditions. Oliver Creek NTU levels ranged from a low of 8 to a high of 55 with a median value of 12. These levels are below the maximum NTU levels found on one study of Mill Creek in the Alsea river basin (Beschta,1979) and the median values of 7 and 12 NTU are well below the 30 NTU standard Oregon DEQ set for the Umatilla sub-basin Total Maximum Daily Load assessment.(ODEQ,1999). No turbidity data has been located for Ernest Creek.

Turbidity samples were collected on upper Oliver Creek just below the project area, above and below the culvert at Rd. 13-6-29, during a rain storm on 11/29/00. For this storm event, with approximately 1 inch of precipitation in a 24-hr period, there was no measurable difference in the mean NTU levels of the stream above and below the road. The ranges and (means) of these samples were 2.6- 40.2 (11.6) and 3.8 - 36.7 (12.1) NTU'S, above and below the culvert, respectively. An unpaired T-Test indicated that the difference between the means of the two groups was not statistically significant at the 95 percent confidence level.

During field review of stream channels in the project area, channels were observed to be stable and functional with sediment supplies in the range expected for these stream types. Furthermore, turbidity data indicates that fine sediment supply and transport are within the range of natural variability in these watersheds. However, sampling to date has been infrequent. Currently there is not enough sediment data in these watersheds to provide a detailed representation of water quality conditions. In response to these concerns, physical and biological monitoring in these watersheds is ongoing.

Stream Temperature

No stream temperature data for Ernest Creek or Oliver Creek was located for this analysis. Stream temperatures in lower Peak Creek exceeded the State of Oregon's standard of 17.8 °C degrees in the summer of 1995 and 1996. Temperatures in lower and upper Peak Creek were below the threshold in 1997. No additional stream temperature data was located for this analysis.

The headwaters of Ernest Creek and Peak Creek in the project area do not flow on the surface during most summers. Therefore, only one channel in the project area, upper Oliver Creek, is perennial and has the potential to be heated by exposure to direct solar radiation. Numerous studies have documented stream temperatures in shaded upland streams that are consistently below Oregon's water quality standard of 17.8 °C degrees. One of these studies (Streamflow, Sediment-Transport, Water-Temperature Characteristics of Three Small Watersheds in the Alsea River Basin, Oregon, USGS Survey Circular #642, 1971) showed temperatures in three shaded upland channels in the Oregon Coast ranging from 16.6 - 1 °C. Based on field and aerial photo observation of Oliver Creek, current stream side vegetation in the project area is adequate to shade surface waters during summer base flow and it is likely that stream temperatures meet the Oregon state standard.

Other Water Quality Parameters

Additional water quality parameters (e.g., nutrients, dissolved oxygen, pesticide and herbicide residues, etc.) are unlikely to be affected by this proposal and were not reviewed for this analysis (U.S.E.P.A.,1991).

Oregon Department of Environmental Quality (DEQ)

The Oregon Department of Environmental Quality's (DEQ) 1998 303d List of Water Quality Limited Streams (http://waterquality.deq.state.or.us/wq/303dlist/303dpage.htm) is a compilation of streams which do not meet the state's water quality standards. A review of the listed streams for the Alsea subasin and the Upper Willamette River SUBASIN was completed for this report. Neither the South Fork Alsea nor Muddy Creek and their tributaries are listed on the 1998 303d report. A portion of the project area directly drains to only one of the listed stream in these subbasins:

North Fork Alsea Mouth to Headwaters
Temperature Standard: Rearing 64 F (17.8 C) Rearing 64 F (17.8 C) Summer

USFS Data (Site near mouth): 7 day average of daily maximums of greater than 64 with a maximum of approximately 70 exceeded temperature standard (64) in 1994

The DEQ has also published an assessment, the 319 Report, which identifies streams with potential non-point water pollution problems (1988 Oregon Statewide Assessment of Non-point Sources of Water Pollution).

Table A. *1988 Oregon Statewide Assessment of Non-point Sources of Water Pollution*

	Water Quality Conditions Affecting:				
Basin: Stream	**General WQ**	**Drinking Water**	**Recreation/ Shellfish**	**Fish**	**Aquatic habitat**
South Willamette: Muddy Cr.	NP	NP	NP	NP	NP
Oliver Cr.	NP	NP	NP	NP	NP
Alsea: North Fork	NP	NP	NP	NP	NP
Lower South Fork	MO	NP	NP	MO	MO

NP = No Problem And/Or No Data
MO = Moderate Problem based on Observation (no collaborating data)

The lower South Fork Alsea (but not the upper) was identified as having moderate water quality problems which may be affecting general water quality, fish and aquatic habitat. However, no description of the problem or data in support was located in the report. Other sources of information (watershed analysis, ODFW habitat surveys) give more up to date information, supported by data, on fish and aquatic habitat conditions for these streams (see the Fisheries report in this assessment).

Beneficial uses of surface water from the project area are displayed in **Table A**. There are no known municipal or domestic water users in the project area. Irrigation and livestock watering occur in the Alsea valley and in the Muddy Creek valley, several miles downstream from the project area. Additional recognized beneficial uses of the stream-flow in the project area include anadromous fish, resident fish, recreation, and esthetic values.

Table B *Beneficial Uses Associated with Streams in the Project Area*

Stream (Watershed)	Proposed Activity	Beneficial Use of Water	Approximate Distance Downstream from Project	Information Source
Oliver Creek (Muddy Creek)	Stand density management Road reconstruction.	Anadromous fish	> 10 miles	BLM
		Resident fish	immediately below project area	BLM
		Domestic use	> 10 mile	WRIS*
		Irrigation/live-stock watering	3 miles	WRIS*
Stream (Watershed)	**Proposed Activity**	**Beneficial Use of Water**	**Approximate Distance Downstream from Project**	**Information Source[1]**
Peak Creek (South Fork Alsea)	Stand density management Road construction/ reconstruction.	Anadromous fish	4 miles (below Green Peak falls)	BLM
		Resident fish	immediately below project area	BLM
		Domestic use	> 10 miles	WRIS
		Irrigation/live-stock watering	> 10 miles	WRIS
Stream (Watershed)	**Proposed Activity**	**Beneficial Use of Water**	**Approximate Distance Downstream from Project**	**Information Source**
Ernest Creek (North Fork Alsea)	Stand density management Road reconstruction.	Anadromous fish	1.5 miles (below falls)	BLM
		Resident fish	immediately below project area	BLM
		Domestic use	> 10 mile	WRIS
		Irrigation/live-stock watering	2 miles	WRIS

1. WRIS = *Water Rights Information System* on the Oregon Department of Water Resources website.
BLM- from field surveys by Marys Peak RA fisheries staff.

Water: Environmental Consequences

Alternative1, (Proposed Action)

Direct and Indirect Effects

Summary

Measurable effects to watershed hydrology, channel morphology, and water quality as a result of the proposed action are unlikely. This action is unlikely to alter the current condition of the aquatic system either by affecting it's physical integrity, water quality, sediment regime or in-stream flows.

This proposal is unlikely to substantially alter stream flow or peak flow events. Tree removal and road renovation would not occur on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action. In addition, potential impacts resulting from tree harvest and road construction/renovation would be mitigated and, with the implementation of BMPs, are unlikely to contribute measurable amounts of sediment to streams. Although thinned, substantial portions of the riparian canopy would be retained therefore maintaining riparian microclimate conditions and protecting streams from increases in temperature.

In conclusion, this proposal is unlikely to impede and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy (ACS). Over the long term this proposal should aid in meeting ACS objectives by speeding the development of older forest characteristics in the riparian zone (Reference Appendix B-1).

Streamflow

Alterations in the capture, infiltration and routing (both surface and subsurface) of precipitation, as a consequence of the mechanical removal of trees and reductions in stand density, has been documented on watersheds in the Pacific Northwest and other parts of the world. However, the actions reviewed under this proposal will affect less than 1 percent of the forest cover in the three watersheds. Therefore, detectable direct or indirect effects to streamflow as a result of this action are unlikely (Bosch, et. al 1982). However, this action was analyzed for its potential contribution to *cumulative effects* to streamflow in these watersheds (see Cumulative Effects in this document).

Water Quality

Sediment Delivery to Streams and Turbidity

Two natural erosion processes, mass wasting and surface erosion, are the primary sources for sediment delivery to streams. Mass wasting in these watersheds is generally limited to hillslopes with gradients steeper than 60 percent (SF Alsea, NF Alsea and Benton Foothills WSA). Management on steep slopes may accelerate mass wasting processes. Surface erosion processes in the Oregon coast range are nearly non-existent on forested land due to the high infiltration capacity of native soils, heavy vegetative growth and deep layers of surface organic

material or "duff layer". However, practices that compact the soil surface, remove the duff layer or concentrate runoff may lead to surface erosion with the potential for delivery to streams and a degradation of water quality. Management practices with the potential to accelerate erosion fall into three categories: road construction, timber harvest, and site preparation (particularly prescribed burning). Best management practices (BMPs) and mitigation measures are proposed to eliminate and/or limit acceleration of sediment delivery to streams in the project area.

Riparian "no-treatment zones"

For the protection of stream channels and aquatic resources, buffers or "no-treatment zones" were applied to all stream channels in the project area. These zones were determined in the field by BLM personnel following a protocol developed by the area hydrologist, biologists and riparian ecologist. This zone could be extended upslope, during field surveys, as far as deemed necessary to protect aquatic resources. This determination was based on site features such as floodplains, slope breaks, slope stability, water tables, etc.. Additionally, no treatments in riparian areas are proposed unless stand densities and composition clearly indicate the need (see the South Fork Alsea , NF Alsea and/or Benton Foothills WSA for a discussion of criteria and treatment objectives). Hence, large areas of riparian vegetation were excluded from treatment under this proposal.

Road construction and hauling

All the proposed road construction and reconstruction locations have been reviewed in the field for potential effects to water quality. All new construction is limited to moderate to low gradient sites (<10 percent) and all new permanent construction is located outside of riparian reserves. Reconstruction of some surfaces will reduce or nearly eliminate the risk of stream sedimentation along surfaces that are currently being utilized as recreational trails. The risk of impacts to water quality due to road construction would be limited by restricting work to periods of low rainfall and runoff. Construction would employ techniques to reduce concentration of runoff and sediment to a minimum, such as water-bars on steeper sections of road. Since there would be approximately 5,100 feet less road than currently exists due to decommissioning, water quality should improve once revegetated.

The main haul routes will likely follow the rocked forest roads for several miles to paved surfaces in the Muddy Creek watershed. Timber hauling during periods when water is flowing on roads and into ditches could potentially increase stream turbidity if flows from ditches were large enough to enter streams. The contract administrator will monitor conditions and take steps to mitigate hauling related sediment entry into streams.

Tree harvest and yarding

Yarding corridors, if sufficiently compacted, may route surface water and sediment into streams. However, several factors limit the potential for this to occur: 1) even if compacted, high levels of residual slash on yarding corridors (both machine and cable) would contribute to reducing the

accumulation of runoff by deflecting and redistributing overland flow laterally to areas where it will infiltrate into the soil, 2) gentle gradients in this project area provide little opportunity for surface water to flow, 3) no-treatment zones in riparian areas have high surface roughness which functions to trap any overland flow and sediment before reaching streams, 4) the small size of trees being yarded would limit surface disturbance to minimal levels, and 5) tractor yarding would occur during periods of low soil moisture with little or no rainfall.

Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action.

Site Preparation

Post treatment site preparation such as under-burning or soil surface "scarification," are not proposed. Pile burning may produce small patches of soil with altered surface properties that restrict infiltration. These surfaces are surrounded by large areas that will easily absorb any runoff or sediment that reach them. In addition, piles will be burned outside of riparian reserves and away from surface water or streams.

Stream Temperature

Forest stand density and hence shading immediately adjacent to the upper Oliver Creek, the only perennial stream in the project area, will be left virtually unaltered under this proposal. However, to test the potential for effects to the stream temperature profile in upper Oliver Creek, the Heat Source model (Boyd, 1996) was utilized. The model indicated, "a low potential for increases in stream temperature as a result of the current proposal for thinning in the riparian forest adjacent to upper Oliver Creek. In fact, it implies that, in this reach, stream temperatures during the summer are not sensitive to the amount or composition of riparian shade" (a full report on the model methods and results are available in the project file).

Shading along other tributaries in the project area is currently adequate. This proposal is unlikely to effect stream temperatures on any of these streams since surface flow in the summer is rare and, as in the Oliver Creek example, shading will barely be altered. Overall, this proposal is unlikely to have any measurable effect on stream temperatures in project area watersheds.

Channel Stability and Function

In the short term, this proposal is unlikely to alter the current condition of channels in the project area for several reasons; 1) there would be no activities directly in channels, or on streambanks or flood plains, 2) stream flow and sediment delivery are unlikely to be altered, and 3) the supply of large wood in the channel and flood plain will not be altered.

Field review of channels in the project area found that they are functioning within the range expected for these stream types in the Oregon coast range. The minimization of potential

disturbances from the proposed project is likely to result in the maintenance of project area stream channels in their current condition (i.e, functional).

Over the long term, reductions in stand density will likely increase riparian forest health and tree size. This will lead to increased large wood recruitment for stream channels, an important factor in proper channel function. In addition, more open stands will allow for the growth of important riparian species in the understory, such as western red cedar, which are currently suppressed. Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat.

Alternative 2, (No Action)

No action would result in the continuation of current conditions and trends at this site as described in the *Description of the Affected Resource* section of this report and in the *South Fork Alsea, North fork Alsea and Benton Foothills* watershed analysis documents.

Water: Cumulative Effects

Streamflow

In almost all cases, removal of more than 20 percent of the vegetative cover over an entire watershed will result in increases in mean annual water yield (Bosch, et. al 1982). Removal of less than 20 percent of vegetative cover has resulted in negligible changes where it was not possible to detect any effect (i.e., the error in measurements was greater than the change). Typically increases in stream flow occur during periods of low soil moisture and are attributed to reductions in evapotranspiration.

In addition to alterations in mean annual water yield, alterations in the timing and/or quantity of peak flow events as a result of forest harvest and road construction have been studied for several decades. Jones and Grant (1996) hypothesized that clear-cutting leads to increases in streamflow volume while road construction and wood removal from channels results in earlier, higher peak flows. Alterations in peak flow timing and quantity are particularly of concern in watersheds with potential for snow accumulation and quick melt-off during rain-on-snow events (ROS) such as occurred in the 1996 flood.

A “Preliminary" analysis of the risk for cumulative effects to hydrologic processes, channel conditions and water quality for the three watersheds was conducted utilizing the *Salem District Watershed Cumulative Effects Analysis Procedure*, *FY1994*.

Preliminary analysis results-

Ernest Creek

* The Ernest Creek watershed covers approximately 4,567 acres of which 2,884 (63 percent) are private land while the remaining 1,683 (37 percent) are managed by the BLM. 803 acres (18 percent) of the watershed is "immature" (consisting primarily of recent clear-cuts less than 10 years in age or agricultural land) while closed stands of conifer and deciduous species cover 3,764 acres (82 percent) of the watershed (see Appendix 1, Figure 1).

* There are 2,800 acres of private forest stands in the watershed which are assumed to be managed on a 40 year harvest rotation (25 percent harvested each decade). Approximately 430 acres of public land in matrix is available for regeneration harvest or thinning within the next 10 years; 1,253 acres are available for commercial thinning or stand density management (in LSR's and riparian areas).

* The transient snow zone (TSZ) comprises approximately 1,569 acres (34 percent) of the watershed.
829 acres (52 percent) of this zone is on public lands.

* Currently, the average "r factor" value in the watershed is 1.44 (on a scale of 0-3, with 3 = high risk of increases to peak flows). 1,340 acres (29 percent) of the watershed is at moderate to high risk for alteration of peak flows. Of this, 93 percent is on agricultural lands in the valley bottom.

The preliminary analysis indicates that currently a moderate risk level for cumulative effects to water quality, channel conditions and hydrologic conditions in the Ernest Creek watershed exists. Most of the risk involves private lands in agricultural zones. However, with the large acreage of upland forest available for harvest and/or thinning in the next ten years, potential exists for forest management to add cumulatively to the current levels. As a result, a more intensive analysis was conducted to further define risks.

A Level 1 analysis for increases in peak flows was conducted using the Washington State DNR watershed analysis methods (Washington Forest Practice Board, 1997). Details of the analysis are contained in a supplemental report (*Cumulative Effects Analysis for the Ernest Creek Watershed).*

In summary, the analysis found a low sensitivity to increases in peak flows both for normal storm events and for severe events with a high likelihood of ROS. WAR estimated no more than a 6 percent increase in peak flows above full forest cover. Predicted increases of less than 10 percent are considered to be within the range of method error. Therefore, it was concluded that potential cumulative effects leading to increases in peak flows, under this proposal in conjunction with other likely actions in Ernest Creek during the next decade, are ***low***.

Oliver Creek

* The Oliver Creek watershed covers approximately 6,874 acres of which 4,838 (70 percent) are

private land while the remaining 2,036 (30 percent) are managed by the BLM. 1,856 acres (27 percent) of the watershed is "immature" (consisting primarily of recent clear-cuts less than 10 years in age or agricultural land) while closed stands of conifer and deciduous species cover 4,304 acres (63 percent) of the watershed.

* 2,576 acres (53 percent) of the private forest stands in the watershed are old enough to be thinned or clear-cut harvested (greater than 40 years in age) within the next 10 years. Approximately 1,400 acres (69 percent) of public land is available for regeneration harvest or thinning within the next 10 years.

* The transient snow zone (TSZ) comprises approximately 1,488 acres (22 percent) of the watershed.
714 acres (48 percent) of this zone is on public lands.

* Currently, the average "R factor" value in the watershed is 1.54 (on a scale of 0-3, with 3 = high risk of increases to peak flows). 2,283 acres (33 percent) of the watershed is at moderate to high risk for alteration of peak flows.

The preliminary analysis indicates that currently a moderate risk level for cumulative effects to water quality, channel conditions and hydrologic conditions in the Oliver Creek watershed exists. Most of the risk involves private lands in agricultural zones. However, with the large acreage of upland forest available for harvest and/or thinning in the next ten years, potential exists for forest management to add cumulatively to the current levels. As a result, a more intensive analysis was conducted to further define risks.

A Level 1 analysis for increases in peak flow and risks to aquatic resources was conducted using the Washington State DNR watershed analysis methods (Washington Forest Practice Board, 1997). Details of the analysis are contained in a supplemental report (*Cumulative Effects Analysis for the* Oliver Creek *Watershed).*

In summary, the analysis found an "indeterminate" sensitivity to increases in peak flows. WAR estimated a an 11.8 percent increase in an unusual 2-yr peak flow above full forest cover. Therefore, it was concluded that potential cumulative effects leading to increases in peak flows, under this proposal in conjunction with other likely actions in Oliver Creek during the next decade, cannot be ruled out. Therefore, it was suggested that additional information be collected/analyzed in order to provide a more detailed assessment of the risks to the aquatic system (i.e., a Level 2 assessment). Additionally, the analysis stated that,

"The indeterminate rating does not require that the actions considered under this proposal be delayed or postponed. Rather, it points to the possibility of impacts to the aquatic ecosystem in the Oliver Creek watershed *at some point during the ten year analysis period*. Furthermore, a WAR analysis that separated public from private actions in the watershed (see Appendix 3) found that the 10 percent threshold would be exceeded *without any forest management on public lands.*

Forest management on public lands alone (i.e., private lands remain unharvested) is predicted to increase a 2-yr event (unusual storm) from 1192 cfs to 1289 cfs; an increase of 8.2 percent over hypothetical full forest cover and 1.4 percent over current conditions. Additionally, the increases predicted in this assessment remain far below the 20 percent increase in a 2-yr peak flow given as a threshold value for considering the effects of increased bed mobility and bed scour."

Peak Creek

* The Peak Creek watershed covers approximately 7,022 acres of which 3,489 (50 percent) are private land while the remaining 3,533 (50 percent) are managed by the BLM. 1,616 acres (23 percent) of the watershed is "immature" (consisting primarily of recent clear-cuts less than 10 years in age or agricultural land) while closed stands of conifer and deciduous species cover 4,304 acres (61 percent) of the watershed.

* 2,014 acres (58 percent) of the private forest stands in the watershed are old enough to be thinned or clear-cut harvested (greater than 40 years in age) within the next 10 years. Approximately 2,700 acres (76 percent) of public land is available for regeneration harvest or thinning within the next 10 years.

* The transient snow zone (TSZ) comprises approximately 2,902 acres (41 percent) of the watershed.
1,567 acres (54 percent) of this zone is on public lands.

* Currently, the average "r factor" value in the watershed is 1.44 (on a scale of 0-3, with 3 = high risk of increases to peak flows). 1,905 acres (27 percent) of the watershed is at moderate to high risk for alteration of peak flows.

The preliminary analysis indicates that currently a moderate risk level for cumulative effects to water quality, channel conditions and hydrologic conditions in the Peak Creek watershed exists. With the large acreage of upland forest available for harvest and/or thinning in the next ten years, potential exists for forest management to add cumulatively to the current levels. As a result, a more intensive analysis was conducted to further define risks.

A Level 1 analysis for increases in peak flows was conducted using the Washington State DNR watershed analysis methods (Washington Forest Practice Board, 1997). Details of the analysis are contained in a supplemental report (*Cumulative Effects Analysis for the Peak Creek Watershed).*

In summary, the analysis found a low sensitivity to increases in peak flows both for normal storm events and for severe events with a high likelihood of ROS. WAR estimated no more than a 8.1 percent increase in peak flows above full forest cover. Predicted increases of less than 10 percent are considered to be within the range of method error. Therefore, it was concluded that potential cumulative effects leading to increases in peak flows, under this proposal in conjunction with other likely actions in Peak Creek during the next decade, are ***low***.

G. Riparian

Issues: Effects on water quality objectives of the Aquatic Conservation Strategy

Riparian: Affected Environment

Riparian Reserve Widths

Riparian Reserves in the proposed project would be 420 feet on each side of perennial fish-bearing streams and 210 feet on each side of intermittent and perennial non-fish bearing streams. These widths are in conformance with the *ROD* (p.10). Within these Riparian Reserves, stands would be thinned to densities ranging from 59 to 76 trees per acre (average 67 trees per acre). The actual riparian zones along streams would be excluded from treatment, and only the upslope portions of the Riparian Reserves would be proposed for density management. See Appendix A-4 for criteria used to identify "No cut stream buffers".

Structure/Species Composition

The stands in the proposed project area are relatively young (approximately 60 years) and all are uniform, densely stocked Douglas-fir stands. All still have relatively high crown ratios (30 percent to 50 percent). Canopy closure averages 80 percent with little understory development. Hardwoods occur scattered throughout the stands, but most occur along streams. Western Hemlock occurs in all three units as a minor species, and in Unit B as approximately 40 percent of the conifer stocking. Many small snags occur, but most are 14" in diameter or less. There are a few large (over 24" DBH) snags which did not show up in the stand exam data. All three units have adequate CWD (in cubic feet), but few logs are in decay class 1 or 2.

See the silvicultural prescription for specific stand data.

Disease

Phellinus weirii was observed in most of the stands where it has created scattered openings less than ½ acre. Swiss needle cast was not observed in the area. It has been a continuing serious problem in Douglas-fir stands near the coast, but in recent years has been observed further inland. There is no consensus yet on how to manage stands infected or at risk for the disease, but it is agreed that selecting for other species where possible is a wise strategy.

Course Woody Debris (CWD)/Snags

The *Benton Foothills Watershed Analysis* recommends for density management projects in Riparian Reserves, that 2 snags per acre in the largest diameter classes be left. It also recommends leaving the minimum levels of CWD recommended by the *Late-Successional Reserve Assessment,*

Oregon Coast Province-Southern Portion (LSRA), June 1997, plus 3 to 5 hard logs over 12" per acre. As Table C indicates, although the project areas meet *LSRA* cubic foot CWD requirements, they are lacking in down wood in decay classes 1 and 2. Snags in the proposed project are generally too small to meet *BFWA* snag recommendations.

Table C *Snags and Down Wood occurring in proposed project area*

Unit	CWD (cu. ft/ acre)[1]	CWD Decay Class 1-2 (pieces/acre >8')	CWD Decay Class 3-5 (pieces/acre >8')	Snags (#/acre)	Snags size range (DBH)
25A,C	4194	10	150	78	7.0"-14.0" (9.6" average)
25B	2626	35	101	47	7.0"-14.0" (10.2" average)

1. Using strategy #3 described in the *LSRA*, required short term CWD minimums from Table 12 (p.61) range between 525 and 2844 cubic feet.

Riparian: Environmental Consequences

Alternative1, (Proposed Action)

The prescription for the uplands portion of the stands would be appropriate for the Riparian Reserves since it would also accomplish the goals identified for the Riparian Reserves. The goal of growing large trees more quickly and maintaining crown ratios can be achieved with a generally evenly spaced thinning. Some variable spacing would be accomplished by marking extra trees to cut in areas with a developing understory, or near trees with "wolfy" characteristics. In addition, extra leave trees would be marked next to existing snags, creating small clumps of trees. Later when the uplands are regeneration harvested, emphasis in the Riparian Reserves would be to release conifer understory, create large diameter CWD and snags, and enhance variable spacing.

Development of desired stand characteristics would be accelerated in the following ways:

- **Restored structural complexity of the stands:** The proposed action would increase the amount of light penetrating the canopy. Increased light levels would promote growth and development of vegetation found at mid canopy and ground levels. It is expected that understory initiation of shade tolerant conifers associated with canopy layering would be promoted in areas of increased light over the long term. In the short term a more complex understory would develop, consisting of more shrub species.

- **Accelerated development of desired tree characteristics**: Residual trees would increase in diameter and crown depth/width. Limb diameter on large limby trees would be maintained by releasing those trees to an open grown condition. The long-term results of

density management would be larger average DBH, and larger crowns (higher crown ratios) at any given age, compared to the no treatment option. As Table 1 and 2 indicate, diameters 50 years in the future in the treated stands would range from 12 to 23 percent larger, (Douglas-fir DBH's increase by 23 percent in Unit B, although western hemlock diameters in that Unit remain almost the same for either treatment). Crown ratios, which are indicators of wind firmness and crown depth would range from 16 to 22 percent higher. Relative density (RD in the tables) is an indicator of mortality from competition. RD in Units 25 A, B and C is lowered to .35 by density management, and remains relatively low 50 years later. A lower RD indicates a higher chance for understory development. Relative densities in all Units are lower for treated stands 50 years in the future.

Table D: *Units A and C, Treatment vs. No Treatment 50 years in the future*[1]

Treatment	Age	DBH	Trees/Ac	BA	RD[2]	Crown Ratio	Cum. Mortality trees/Acre[3]	Av. Snag/CW DBH[4]
Original Stand	60	18.1	129	230	0.54	0.3		
Proposed Treatment Thin to 160 BA DF only	60	20.9	67	160	0.35	0.31		
No Treatment	110	25.8	101	366	0.72	..38	11	12.3
With Treatment	110	30.1	54	266	0.48	0.49	6	19.2

1. In order to compare results of the proposed treatments versus no treatment, the stands were modeled using SPS. Numbers generated by growth and yield models can be used as a relative comparison of treatments in a given stand, but are not necessarily accurate predictions of future growth. Future stand measurements are dependent on disturbance patterns and other stochastic events which can never be accurately predicted.
2. RD (relative density) is a ratio: trees per acre in a stand adjusted to a 10 inch diameter, divided by the number of trees per acre in a fully stocked stand 10 inches in diameter (595 for DF). 0.35 is the point where growth slows from competition. 0.6 is the point where competition begins to cause mortality.
3. Model runs did not include trees reserved for future snag/CWD creation.
4. Includes trees reserved for future snag/CWD creation and assumes they will equal or exceed average stand diameter.

Table E: *Unit B Treatment vs. No Treatment 50 years in the future*

Treatment	Age	DBH	Trees/Ac	BA	RD	Crown Ratio	Cum. Mortality trees/Acre[3]	Av. Snag/CW DBH[4]
Original Stand	57	14.4 DF: 14.8 WH: 13.0	260 DF: 156 WH: 104	295	0.78	0.5		
Proposed Treatment Thin to BA 160 Cut Df only	57	15.3 DF: 22.1 WH: 13.0	126 DF: 22 WH: 104	160	0.41	0.72		
No Treatment	107	21.8 DF: 25.0 WH: 19.2	137 DF: 53 WH: 84	355	0.76	0.47	61	13.5
With Treatment	107	22.0 DF: 28.8 WH: 19.8	100 DF: 20 WH: 80	267	0.57	0.56	11	14.2

Desirable characteristics of CWD, snags and large wood in streams would be enhanced in the following ways:

1. Trees smaller than stand average and at a consequently higher risk of mortality, would reach an average 20" DBH more quickly, compared to the no treatment option, creating natural opportunities for larger snag/CWD formation. Average snag/CWD DBH'S in Tables 1 and 2 range from 5 to 38 percent larger than in the no treatment alternative.

2. CWD and snag enhancement would be achieved using strategy # 3 as described in the *LSRA* (p.68). This strategy creates some short term CWD and snags, but reserves most as green trees to maximize long-term quantities and sizes of CWD and snags. Post harvest monitoring would be accomplished to evaluate the size and condition of snags and CWD It is expected the harvest operation would create some CWD and possibly knock down some snags. Creation of CWD during harvest could come from harvest activities, post harvest windthrow, and beetle kill. The monitoring would be done three years after the harvest has maximized opportunities for natural creation of CWD and snags. After monitoring, two trees per acre would be cut and left where needed to supply hard CWD Snags would be created where needed to meet recommendations in the *BFWA*. Following CWD scenario # 3 in the *LSRA*, most CWD and snags would be left as green trees until the upland portion of the project area is regeneration harvested. At that time additional CWD and snags would be created in the Riparian Reserves .

3. Large wood in streams would be immediately increased be cutting and placing approximately 4 conifers/ acre in or adjacent to streams in the project area. Conifers cut

would be equal to or larger than the average stand diameter. Additional trees could be cut and placed in streams in the project area at the same time that additional upland CWD is created (approximately 3 to 4 years after the sale). Numbers of logs placed in or near streams at that time would be determined by the fisheries biologist and subject to guidelines established for the Siuslaw National Forest for minimizing bark beetle infestation (Appendix B-2). Both projects would be accomplished by BLM personnel or service contract, and subject to funding.

Opening up the canopy may cause such ground level micro climatic changes as increased light levels, increased temperatures, higher humidity and increased wind speed. These effects vary depending on aspect, slope and vegetation removed and are difficult to quantify. Preliminary data from some studies show that these effects are generally limited to the first 50 to 75 feet from a stream. It is expected that most of these effects would be mitigated by the stream protection zone, and that those that do occur would be of short duration and would be ameliorated as crowns close and brush covers the ground.

There would be a short term elevated risk of Douglas-fir bark beetle infestation in healthy standing trees, due to unyarded cut trees, windthrow, and logging damage to residual trees. Bark beetle infestation risk may be minimized by following guidelines developed for the Siuslaw National Forest. A summary of those guidelines is attached (Appendix B-2).

Alternative2, (No Action)

Impacts or lack thereof on riparian resources would be as follows:

- There would be no disturbance and consequently no microclimate changes in the Riparian Reserves.

- There would be no short term elevated risk of bark beetle infestation. Long term risk may increase as increased stand density causes increased mortality and decreased tree vigor.

- Stand mortality due to competition would increase, creating increased amounts of small CWD and snags (Tables 1 and 2).

- Trees would continue at their present rate of growth, slowing as the canopy closes and competition for light becomes more intense (Tables 1 and 2).

- Crown ratios would decrease at a faster rate compared to Alternative 1 (Tables 1 and 2).

- The canopy would remain closed, allowing little light to penetrate to the ground. The relative density (RD) of the stands in Units 25A and D; and 25 B, as modeled on SPS, would be 0.72 and .76, respectively if left untreated for 50 years (Tables 1 and 2). 0.6 is considered the point where mortality due to competition begins. Therefore it can be concluded that no significant understory would develop within the next 50 years and

beyond without density management.

- Natural disturbance would be the agent for creation of stand structural diversity. The most likely agent for this disturbance would be wind, which would create openings in patches. It is unknown how long it would take for natural disturbance to create the structural and species diversity needed in these watersheds, but it is expected, based on experience and a considerable body of research, that this diversity would take considerably longer to develop than if the proposed treatment were implemented.

H. Fisheries

Issue: Effects on listed fish species and their habitats.

Fisheries: Affected Environment

The project area contains the headwaters to Peak Creek (Coastal), Oliver Creek (Willamette), and a small piece of Earnest Creek (Coastal). Peak Creek and Oliver Creek both contain cutthroat trout (*Oncorhynchus clarki*) within the project area (see map). Both streams have typical headwater conditions of step pools and cascades with larger cobbles and bedrock as the dominant substrate. Fish are blocked by natural barriers (Falls or steep cascades)on both streams.
Both streams are down in a V-shaped valley constrained by hillslopes.

A tributary to Earnest Creek is just within the project area and only flows in the winter during heavy precipitation. No fish are present in Earnest Creek in the project area.
Peak Creek is a tributary to The South Fork Alsea which contains Coho Salmon (*Oncorhynchus kisutch).*

Listed Fish Species

Coastal Coho Salmon are listed as threatened under the Endangered Species Act. Conferencing with the National Marine Fisheries Service (NMFS) on this proposed project is in process.

Fisheries: Environmental Consequences

Alternative 1 (Proposed Action)

The proposed action would have no measurable adverse impacts to local fish and fish habitat. Habitat and channel conditions are expected to be maintained. Impacts may occur due to small inputs of sediment, but would be short term (a year or less). Seasonal restrictions, one end suspension, the size of the logs and amount of timber that will be removed (thinning) in conjunction with stream protection zones will keep sediment delivery to a minimal level. Thinning within the riparian area will enhance stand conditions, growing trees faster than if the stand were to grow naturally. This would increase the potential for high quality large woody debris.

Alternative2, (No Action)

No action would result in the continuation of current habitat conditions and trends at this site.

I. Wildlife

Issue: Effects on special status species, special attention species and on wildlife habitats.

Wildlife: Affected Environment

A. Alternative 1 (Proposed Action)

Special Status Species

The proposed project is a no affect on northern spotted owl or marbled murrelet habitat. The proposed project was determined to be a "may affect, not likely to adversely affect" to northern spotted owls and marbled murrelets due to noise disturbance that may occur during the breeding season in unsurveyed suitable nesting habitat adjacent to unit 25C. To address this concern, consultation with the U.S. Fish and Wildlife Service (USFWS) under the *Programmatic Biological Assessment of Fiscal Year 2001 Projects in the North Coast Province Which Would Disturb Bald Eagles, Northern Spotted Owls or Marble Murrelets* (BA) was initiated on January 2, 2001. All activities to occur under this proposed project have been designed to the standards described in the BA, and will also include any applicable terms and conditions from the resulting Biological Opinion.

Northern Spotted Owl (*Strix occidentalis*)

The mid-seral habitat in section 25 provides foraging, roosting, and dispersal habitat for the Northern Spotted Owl. There are a few scattered late-seral remnants adjacent to unit 25C with dead tops that provide potential nesting habitat for the owl. The project area is not in Critical Habitat nor in a Reserve Pair Area. The closest known active northern spotted owl site (Oliver Valley, T13S, R06, S32) is 1.4 miles to the southeast of unit 25A.

Marbled murrelet (*Brachyramphus marmoratus*)

There is no suitable marbled murrelet nesting habitat or Critical Habitat in any of the three units in the project. Adjacent to unit 25C there are a few scattered late-seral remnants which may provide suitable nesting platforms for murrelets. Each remnant was carefully checked from the ground for potential nest platforms with adequate cover. Most of the trees had branch diameters too small and too open to support a suitable nest. Two or three of the remnants had some structure for a platform but the side and overhead cover seemed too sparse. The closest known occupied marbled murrelet site (Parker Slide 07NW) is six miles to the west of these units. The

closest Critical Habitat (Late Seral Reserve) is less than one mile away and occurs as three small stands of old-growth (12, 18, and 32 acres) to the northwest and southwest of section 25. These stands were surveyed to protocol during the 1992 and 1993 seasons and no detections were recorded.

Survey and Manage

Mollusks

The entire project area is suitable habitat for those Survey and Manage mollusks which are expected to occur in the central Coast Range. Ground-based and skyline harvesting may cause direct injury, and a reduction in overstory canopy may cause habitat modification/destruction leading to indirect injury by desiccation.

Inventory of the project area was accomplished in accordance with the survey protocols as spelled out in IM OR-98-097: *Survey and Manage Survey Protocols -Mollusks*, *August 31, 1998*. Specific survey's were accomplished on 6 dates during the spring of 2000 and on 11 dates during the fall of 2000.

Papillose Tail-dropper (*Prophysaon coeruleum*) was found in Units 25 A, 25 B of the project area. Papillose Tail-dropper has been removed from Survey and Manage as depicted in Table 1-2 of the S&M ROD.

Red Tree Voles (*Arborimus longicardus)*

Units 25A and C have an average DBH of 17 inches which is one inch over the 16 inch trigger for vole surveys. Unit 25B has an average DBH of 14 inches but was surveyed due to the presence of some scattered large wolf trees which appear to be suitable vole habitat.

Inventory of Units 25B and C was accomplished in accordance with the survey protocols as spelled in IM-OR-2000-037: *Survey and Manage Protocol - Oregon Red Tree Vole, Version 2.0*, dated February 18, 2000.

No active/inactive red tree vole nests were found in Units 25B and C.

Inventory of Unit 25 A will also be completed in accordance with the previously mentioned approved protocol during April of 2001, and the proposal adjusted accordingly.

Wildlife: Environmental Consequences

Alternative 1 (Proposed Action)

Special Status Species

Northern Spotted Owl

The thinning and density management project would have no significant impacts to owl nesting, roosting, foraging, or dispersal habitat in section 25. Since the late-seral remnants adjacent to unit 25C provide potential nesting habitat for the owl, and are unsurveyed, noise disturbance would be mitigated with the imposition of seasonal (no actions from March 1 through August 5) and daily restrictions (actions shall not begin until two hours after sunrise and shall end two hours before sunset) between August 6 through September 30. The proposed project is considered a "may affect, not likely to adversely affect" on northern spotted owl and marbled murrelets for noise disturbance during the breeding season to unsurveyed suitable nesting habitat adjacent to unit 25C if any activities occur from August 6 through September 30.

Marbled Murrelet

The thinning/density management treatment proposed for the mid-seral habitat in unit 25C would have no impact on the adjacent late-seral remnants or the suitability of any potential nest platforms in them. These remnants have proven their wind-firmness over the past 60 years during which time the second-growth understory developed. Trees to be removed in unit 25C would not be responsible for providing any suitability to nest platforms that may occur in the adjacent remnants. This is due primarily to the locations of the remnants and the take trees. Since the late-seral remnants adjacent to unit 25C provide potential nesting habitat for murrelets, and are unsurveyed, noise disturbance would be mitigated with the imposition of seasonal (no actions from March 1 through August 5) and daily restrictions (actions shall not begin until two hours after sunrise and shall end two hours before sunset) between August 6 through September 30. The proposed project is considered a "may affect, not likely to adversely affect" on northern spotted owl and marbled murrelets for noise disturbance during the breeding season to unsurveyed suitable nesting habitat adjacent to unit 25C if any activities occur from August 6 through September 30.

Survey and Manage

Mollusks

Ground-based and skyline harvesting may cause direct injury, and a reduction in overstory canopy may cause habitat modification/destruction leading to indirect injury by desiccation of the Papillose Tail-dropper, however this species is so prolific that it was removed from protection requirements (Table 1- 2, S&M ROD) and has a high probability of occurring in the surrounding

reserves.

Red Tree Vole

Units 25B and C have been inventoried and no active/inactive nests have been found. If any nests are found in unit 25A they will be protected with a 10 acre Habitat Area in accordance with Management Recommendations for Red Tree Voles (Version 2.0, Sept. 27, 2000). Project activities would have no impact on red tree voles.

Terrestrial Wildlife Habitat

The thinning/density management prescription for the proposed alternative would remove the suppressed, intermediate, and smaller co-dominant Douglas-fir and western hemlock and leave the dominant and larger co-dominant conifers. Post-treatment densities would range from 65 to 75 trees per acre. Since the largest trees with the best crown ratios would be left, the post-treatment crown canopies are expected to be greater than 50 percent over most of the action area. The stands have an adequate amount of hard (Class 1 and 2) snags and some hard coarse woody debris (CWD) but they are all in the smaller diameter classes. Management could abbreviate the recruitment time necessary for the development of larger (greater than 20") hard snags, CWD, and for the development of a more complex overall stand structure. The planned treatment would have little impact on the composition and function of these mid-seral stands. Stand structure would be simplified due to removal of stems, but this is expected to be a short term and insignificant impact.

Alternative 2 (No Action)

Under the no action alternative the uniform, single layered, 55-60 year old, mid-seral stands would continue to grow and develop into late-seral size and structure at a slower rate than if thinned. There would be no impacts to the mid-seral dependent species currently using these stands for nesting and/or foraging.

J. Recreation

Issue: Effects on existing recreation resources in the area.

Recreation: Affected Environment

The entire sale area is a forested setting with fairly flat topography. The area is used by the public for mushroom gathering, horseback riding, walking, target shooting, hunting, wildlife observation and nature study. Overnight use is most likely infrequent. It also has an extensive network of trails that are utilized by mountain bikers and motorcycle riders. The motorcycle use is regulated cooperatively between the adjacent landowner, Starker Forest Products, BLM and the Flat Mountain Riders Association, a local motorcycle club. Approximately 500 feet of existing

motorcycle trail is congruent with a portion of Road F, which will be utilized to haul logs from the north part of **Unit 25 A**. A short section of trail branches south of the above trail and crosses the stream in the same location. There is evidence of siltation of the stream and soil erosion occurring from the existing trail.

The Flat Mtn Riders expressed concerns regarding opening up more roads to allow for illegal dumping and soil erosion by pickup trucks on natural surfaced roads. They also recommended that some of the roads be decommissioned to discourage the same problems.

Recreation: Environmental Consequences

Significant impacts to recreation resources are not anticipated from the or thinning treatments or the road construction and decommissioning. Because of the decommissioning of approximately 300 feet of motorcycle and bicycle trail north of **Unit 25 A** and the rerouting of trail and construction of **Road F** outside of the area that would negatively affect a stream. (See Map in Appendix A-2), motorcyclists and bicyclists would be temporarily inconvenienced during the logging. After logging, riders would utilize a different trail, however the erosion and siltation caused by the existing short trail would cease. Since any other trails traversing the proposed thinning units would be cleared of debris following logging, motorcycle and mountain bike use would not be affected.

Other recreational use of the area would be restricted in the short term during the harvest operation, however would most likely continue after harvesting operations are completed. Anticipated changes to the forest setting would be minimal and current users would most likely continue to enjoy the area. OHV use may increase unless discouraged by the blocking or screening of skid roads after operations are completed.

IV. ADDITIONAL MITIGATION OPPORTUNITY

The measure described in this section was developed to address specific concerns identified through scoping or interdisciplinary review. Adoption of this measure could reduce or avoid certain environmental consequences, but could cause or increase others. This measure has not been included as a design feature under any alternative, but are available for adoption at the discretion of the Area Manager. A decision of whether or not any of these measures are adopted will be documented in the Decision Record.

Alternative 1

Yarding

The seasonal restriction dates for tractor yarding would change from between August 1 and October 15 to between July 15 and October 15.

Approximately 75 percent (134 acres) of the proposed harvest area has been proposed for ground based yarding. Currently, with 2.5 months available for ground based yarding, adding the additional 2 weeks would increase the ability of the timber sale purchaser to complete this sale in one season. Adding this time period would coincide with the end of the yarding restriction for low sap flow and may positively increase the bid price of the timber.

No measurable changes in impacts to soil resources were identified through the interdisciplinary team process for this mitigation measure change.

V. MONITORING

Monitoring would be accomplished through timber sale administration and in accordance with monitoring guidelines in the RMP, Appendix J**.**

VI. CONSULTATION

In addition to the interdisciplinary team that developed and reviewed this proposed action, the following agencies or individuals have or will provide input:

U.S. Fish and Wildlife Service, Regional Office, Portland
National Marine Fisheries Service
Flat Mountain Riders Association
Oregon Natural Resources Council, Eugene
Coast Range Association
Associated Oregon Loggers
State of Oregon
- Oregon Department Environmental Quality
- Oregon Department Fish and Wildlife
- Oregon Division of State Lands
- Oregon Water Resources Division
- Oregon Department Fish and Wildlife OF

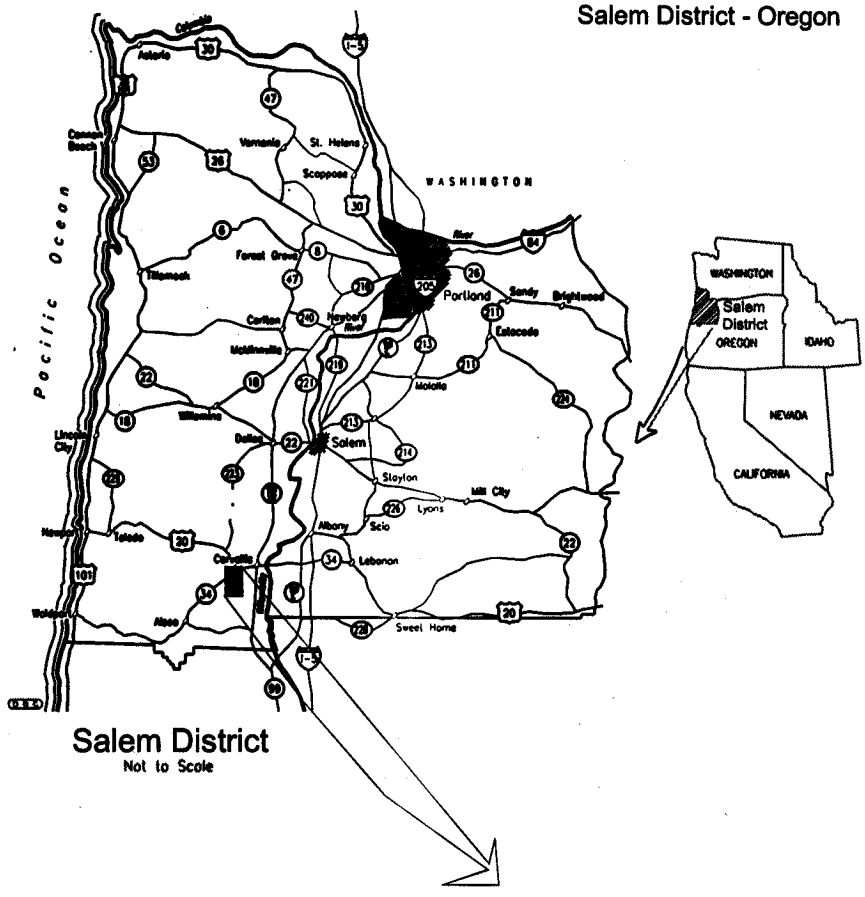
Audubon
Willamette Industries
Hull Oakes Lumber Company
Starker Forests
Confederated Tribes of Grande Ronde
Confederated Tribes of Siletz
Siuslaw National Forest
Siuslaw Timber Operators
Benton County
Marys River Watershed Council
Northwest Environmental Defense Center
Assorted Individual Citizens (List in EA file)

VII. INTERDISCIPLINARY TEAM MEMBERS

NAME	TITLE	DATE/INITIAL
Phil Sjoding	Team Lead	PRS 4/10/01
Dan Schreindorfer	Logging System Specialist	DS 4/03/01
Gary Licata	Wildlife Biologist	4/02/01 gal
Tom Tomczyk	Soil Scientist/Fuels Specialist	TST 4-3-01
Bill Caldwell	Silviculturist	WC 4-4-01
Ron Exeter	Botanist	RE April 3, 2001
Tom Vanderhoof	Cultural Specialist	TMV 4-4-2001
Dave Roberts	Fisheries Biologist	DR 4/3/01
Patrick Hawe	Hydrologist	PH 4/3/01
Russ Buswell	Civil Engineering technician	RPB 4/3/01
Belle Smith	NEPA Coordinator	BS for BS 04/09/01
Amy Haynes	Riparian Ecologist	ah 4/2/01
Randy Gould	Recreation Planner Natural Resource Staff Administrator (management review)	04/02/01

United States Department of the Interior
BUREAU OF LAND MANAGEMENT

Flat Peak Mountain Appendix A-1 General Vicinity Map
Sections 25, T.13 S., R. 7 W., Will. Mer.
Salem District - Oregon



Salem District
Not to Scale

Project Location Map
1" = 1 mile

Sale Area

Access route

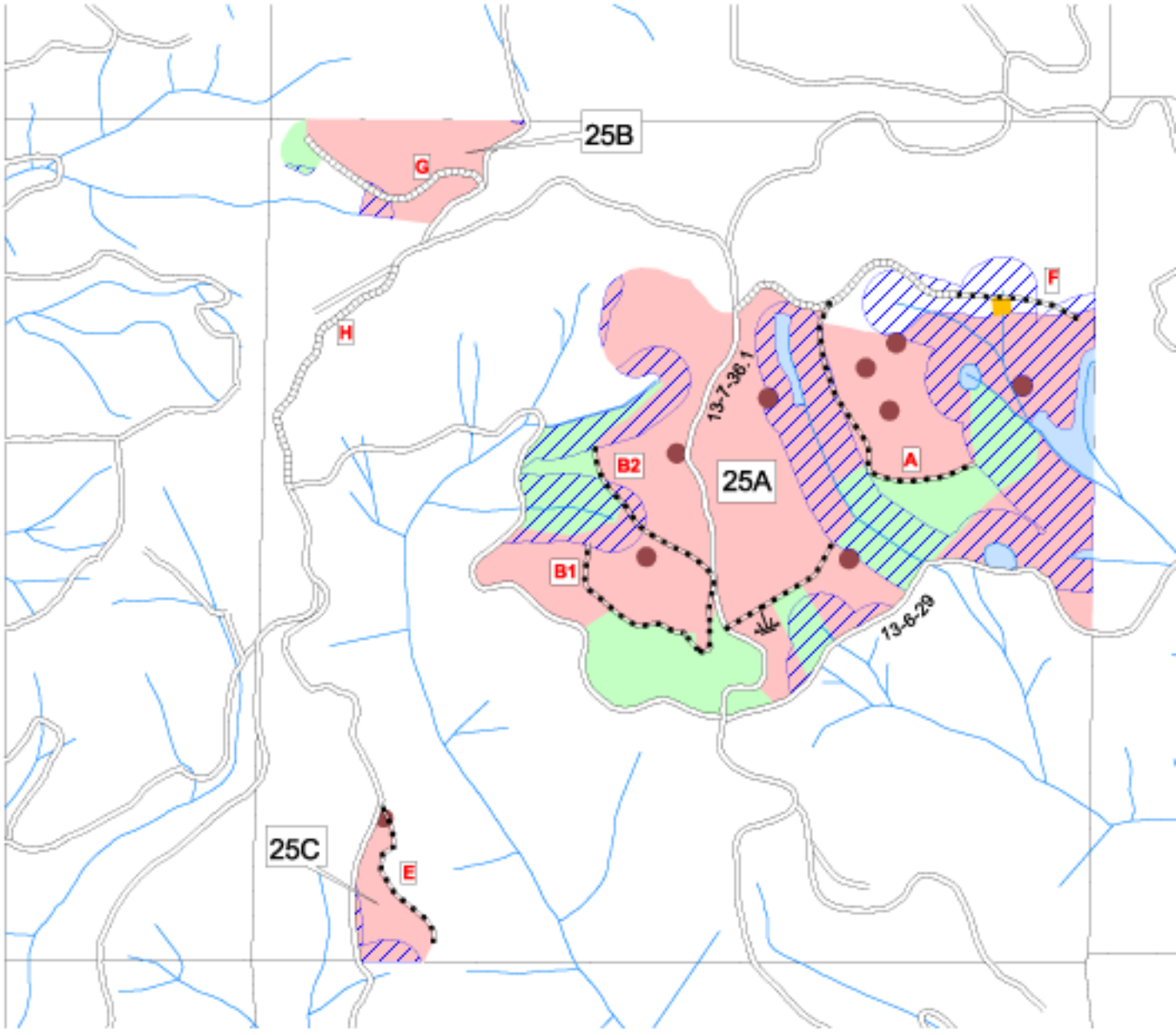
April 5, 2001

United States Departement of the Interior
BUREAU OF LAND MANAGEMENT

Appendix A-2

FLAT PEAK MOUNTAIN - MAP of PROPOSED ACTION

T. 13 S., R. 7 W., Section 25, W. M. - SALEM DISTRICT - OREGON



Existing Road
New Construction
Existing Road to be Decommissioned
Conifer-release area
Riparian Reserves
Ground based yarding
Skyline yarding
Stream Protection Zone (logging feasability)
Fungus Protection Area
Wet Area
Streams

N

Scale: 1" = 1,000'

Appendix A-3: Project Design Features Table
Flat Peak Mtn Timber Sale - Proposed Action

Management Activity	Unit 25A	Unit 25B	Unit 25C	Other	Totals
Unit Size	155	17	6		178
Cutting method (acres)					
Commercial thinning	92	14	5		111
Density Management (RR)	63	3	1		67
Logging System (acres)					
Skyline	39	5			44
Ground-based	116	12	6		134
Roads (feet)					
New Construction	6300		1000		7300
Renovation	1800	1100	1000	5900	8800
Decommission	6300	1100	1000	4000	12400
Site Preparation					
Excavator Piling of vine maple patches (Yes/No)	Yes	Yes	Yes		
Reforestation of piled areas					
Stock Type	Western hemlock	Western hemlock	Western hemlock		

Appendix A-3

Criteria for Identifying "No Cut Stream Buffers"

1) A 25 foot minimum buffer will be flagged to exclude the following areas based on field identified features (whichever is greatest). Activities may occur in this area, but material will not be removed and heavy machinery or equipment will not be allowed.

a. Slope break- point below which the slope is actively eroding and contributing sediment to the stream.

b. Floodplain- flat, accessed by the stream once in a blue moon.

c. Stream banks- feature which contains the "active" stream channel.

d. High water tables- flat, mushy soils, skunk cabbage, standing water, etc..

e. Flood prone- 2 x max depth @ bankfull (for streams with none of the above).

2) "Minimum" will be modified based on associated issues or field identified risks. Examples include-

a. Perennial streams at risk for temperature increases due to the action (i.e., southern aspect, low topographic relief, vegetation provides significant shading). We can either extend the minimum to 100 feet at these sites or apply a model to get more precision in our estimate.

b. Unstable slopes- this is open to discussion. We may want to thin along debris torrent prone headwater channels even though they are potentially "unstable" because these areas are significant LWD source areas. However, actively eroding sites adjacent to streams with ravel on the surface and "jack-strawed" trees may be excluded.

c. "Sensitive" streams- sand bed channels or channels with high residual impacts (bank erosion, incision, heavy fine sediment load, etc) may warrant extra protection.

Appendix: B-1 Aquatic Conservation Strategy Objectives Review Summary

Note - See RMP pg 5-6 for more detailed explanations of the ACS objectives)

ACS Objective	How Project Meets the ACS Objective
1. Maintain and restore distribution, diversity, and complexity of watershed and landscape features to ensure protection of aquatic systems.	According to the *Benton Foothills Watershed Analysis (BFWA*), Sept, 1997,the majority of stands in the watershed have greatly reduced structural diversity and species composition (P.58). In addition, mid-seral stands in Riparian Reserves are generally uniform even-aged Douglas-fir stands and only 6% are classified as having an understory.(BFWA. P. 64) Only 10% of the stands in the South Fork Alsea watershed are currently classified as having an understory. Most mid-seral stands (age 30-80) are uniform evenly-spaced Douglas-fir stands (*North Fork Alsea and South Fork Alsea Watershed Analyses Riparian Reserve Treatment Recommendations Update, RRTRU, May, 2000, p.3)*. Generally the watershed lacks large woody debris potential for streams (*South Fork Alsea Watershed Analysis, SFAWA*, *Nov., 1995*, p.65) and lacks snags, down wood, sub-canopy layers and species diversity (*SFAWA*, p. 40). The proposed density management in the Riparian Reserves would be a means to enhance late-successional forest conditions and speed up attainment of these conditions across the landscape. Since Riparian Reserves provide travel corridors and resources for aquatic, riparian dependant and other riparian and/or late-successional associated plants and animals, the increased structural and plant diversity would ensure protection of aquatic systems by maintaining and restoring the distribution, diversity and complexity of watershed and landscape features..
2. Maintain and restore spatial connectivity within and between watersheds.	Long term connectivity of terrestrial watershed features would be improved by enhancing conditions for understory development (structural diversity), increasing the proportion of minor species in the stand (species diversity), increasing growth rates on remaining trees and creating fresh snags and down wood. In time, the Riparian Reserves would improve in functioning as refugia for late successional, aquatic and riparian associated and dependent species. In the short term, the fresh snags and down wood created by the project would begin to mitigate the lack of snags and down wood in the watershed. Aquatic connectivity would be enhanced by the immediate addition of 4 conifers per acre to and adjacent to streams in the project area. No barriers to aquatic connectivity would be created within the project area. Both terrestrial and aquatic connectivity would be maintained, and over the long-term, as Riparian Reserves develop late successional characteristics, lateral, longitudinal and drainage connectivity would be restored.

3. Maintain and restore physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.	A stream protection zone would be established along all streams and identified wet areas within the harvest area to maintain the integrity of shorelines, banks and bottom configurations. Criteria used to designate stream protection zones were riparian vegetation, significant slope breaks, active floodplain or high water tables, and areas contributing to stream shading. All buffers are a minimum of 25 feet. No cutting or yarding would be permitted in or through the stream protection zones during the sale, and where a cut tree does fall within one, the portion of the tree within the stream protection zone would remain in place. (**EA, p.12 and Appendix A-4**) Field review of channels in the project area found that they are functioning within the range expected for these stream types in the Oregon coast range. The minimization of potential disturbances from the proposed project is likely to result in the maintenance of project area stream channels in their current condition (i.e, functional). Over the long term, reductions in stand density will likely increase riparian forest health and tree size. This will lead to increased large wood recruitment for stream channels, an important factor in proper channel function. In addition, more open stands will allow for the growth of important riparian species in the understory, such as western red cedar, which are currently suppressed. Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat. **(EA, p. 36)** Management activity throughout the project area is not likely to cause any alteration in water flows that could affect channel morphology.
4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.	Water quality necessary to support healthy riparian, aquatic, and wetland ecosystems would be maintained. Stream Temperature: Forest stand density and hence shading immediately adjacent to the upper Oliver Creek, the only perennial stream in the project area, would be left virtually unaltered under this proposal. Shading along other tributaries in the project area is currently adequate. This proposal is unlikely to effect stream temperatures on any of these streams since surface flow in the summer is rare and, as in the Oliver Creek example, shading will barely be altered. Overall, this proposal is unlikely to have any measurable effect on stream temperatures in project area watersheds. **(EA, p 35)** Sediment delivery and turbidity: See no.5 below

5. Maintain and restore the sediment regime under which system evolved.	For the protection of stream channels and aquatic resources, buffers or "no-treatment zones" were applied to all stream channels in the project area. These zones were determined in the field by BLM personnel following a protocol developed by the area hydrologist, biologists and riparian ecologist. Hence, large areas of riparian vegetation were excluded from treatment under this proposal. (**EA, p. 34**) All the proposed road construction and reconstruction locations have been reviewed in the field for potential effects to water quality. All new construction is limited to moderate to low gradient sites (<10 %) and all new permanent construction is located outside of Riparian Reserves. Reconstruction of some surfaces will reduce or nearly eliminate the risk of stream sedimentation along surfaces that are currently being utilized as recreational trails. The risk of impacts to water quality due to road construction would be limited by restricting work to periods of low rainfall and runoff. Construction would employ techniques to reduce concentration of runoff and sediment to a minimum, such as water-bars on steeper sections of road. The main haul routes would likely follow the rocked forest roads for several miles to paved surfaces in the Muddy Creek watershed. Timber hauling during periods when water is flowing on roads and into ditches could potentially increase stream turbidity if flows from ditches were large enough to enter streams. The contract administrator will monitor conditions and take steps to mitigate hauling related sediment entry into streams. (**EA p. 34**) Yarding corridors, if sufficiently compacted, may route surface water and sediment into streams. However, several factors limit the potential for this to occur: 1) even if compacted, high levels of residual slash on yarding corridors (both machine and cable) would contribute to reducing the accumulation of runoff by deflecting and redistributing overland flow laterally to areas where it will infiltrate into the soil, 2) gentle gradients in this project area provide little opportunity for surface water to flow, 3) no-treatment zones in riparian areas have high surface roughness which functions to trap any overland flow and sediment before reaching streams, 4) the small size of trees being yarded would limit surface disturbance to minimal levels, and 5) tractor yarding would occur during periods of low soil moisture with little or no rainfall. (**EA, p.34,35**) Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action. (**EA, p.35**) Post treatment site preparation such as under-burning or soil surface "scarification," are not proposed. Pile burning may produce small patches of soil with altered surface properties that restrict infiltration. These surfaces are surrounded by large areas that will easily absorb any runoff or sediment that reach them. In addition, piles will be burned outside of riparian reserves and away from surface water or streams (**EA, p. 35**).

6. Maintain and restore instream flows.	This proposal is unlikely to substantially alter stream flow or peak flow events Alterations in the capture, infiltration and routing (both surface and subsurface) of precipitation have been documented on watersheds in the Pacific Northwest and other parts of the world. However, the actions reviewed under this proposal would affect less than 1% of the forest cover in the threee watersheds. Detectable direct or indirect effects to streamflow as a result of this action are unlikely (**EA, p.33**)
7. Maintain and restore the timing, variability and duration of floodplain inundation and water table elevation in meadows and wetlands.	The proposed thinning would not alter existing patterns of floodplain inundation or water table elevation as it would have no effects or only negligible short-term negative effects on existing flow patterns and stream channel conditions. Alterations in the capture, infiltration and routing (both surface and subsurface) of precipitation, as a consequence of the mechanical removal of trees and reductions in stand density, has been documented on watersheds in the Pacific Northwest and other parts of the world. However, the actions reviewed under this proposal will affect less than 1% of the forest cover in the three watersheds. Therefore, detectable direct or indirect effects to streamflow as a result of this action are unlikely (Bosch, et. al 1982). However, this action was analyzed for its potential contribution to *cumulative effects* to streamflow in these watersheds ...(**EA, p. 33 and EA, pp.36-39 for Cumulative Effects discussion**)
8. Maintain and restore the species composition and structural diversity of plant communities in riparian zones and wetlands to provide thermal regulation, nutrient filtering, and appropriate rates of bank erosion, channel migration and CWD accumulations.	The actual riparian zone along streams would be excluded from treatment, by designating stream protection zones, and only the upslope portions of the Riparian Reserves would be included in the density management treatment**.** (**EA, p. 40 and Appendix A-4)** All trees would be directionally felled away from streams and if a cut tree does fall within a designated stream protection zone, that part of the tree would remain (**EA p. 8**). Residual trees would continue shading streams. Structural components of late-seral forests (large trees, multiple canopy layers, large hard snags, heavy accumulations of down wood, and species diversity) are generally lacking in the young stands surrounding and including the project area. Aside from protecting actual riparian vegetation, the proposed project would restore the species composition and structural diversity of plant communities by enhancing conditions for understory development (structural diversity), increasing the proportion of minor species in the stand (species diversity), increasing growth rates on remaining trees and creating fresh snags and down wood (**EA pp. 41-44**)

9. Maintain and restore habitat to support well distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species	Habitat to support well distributed riparian-dependent and riparian associated species would be restored by reducing overstocked stands, moderating tree species diversity, altering forest structural characteristics and amending coarse woody debris conditions. Thinning within the riparian area would enhance stand conditions, growing trees faster than if the stand were to grow naturally. This would increase the potential for high quality instream large woody debris. (**EA, p.45**). Over the long-term, reductions in stand density would likely increase riparian forest health and tree size. This would lead to increased large wood recruitment for stream channels, an important factor in proper channel function. In addition, more open stands would allow for the growth of important riparian species in the understory, such as western redcedar, which are currently suppressed. In the upper South Fork Alsea River, large wood structure in the channel is particularly important because it has been depleted to levels far below its natural range. Large wood in the channel would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat as well as conditions for beaver **(EA, p.36)**

APPENDIX B-2: GUIDELINES TO REDUCE BARK BEETLE MORTALITY

Guidelines to reduce the probability of Douglas-fir bark beetle (DFB)-caused mortality of residual standing trees in Westside forests where live Douglas-firs are being felled for CWD

- **Fell and leave the minimum number of trees possible that will allow achievement of CWD objectives.** Remember, the rule-of thumb is that the number of standing trees killed will be about 60 percent of the number that are felled.

- **Fell the trees no earlier than July and no later than the end of September – the later they can be felled during this period, the better.** This will help insure that the trees are felled after the primary flight of DFB and that some drying of logs will occur so that the logs will be less suitable as host material the following spring.

- **Staggering the years in which trees are being felled may be beneficial if large numbers of trees are being felled and if enough time is left between felling.** The time period between tree falling should be at least 3 years; 4 would be better. Otherwise, the situation may be exacerbated by allowing beetles to build to even higher population levels.

- **Monitor what is happening in these stands regarding infestation of down logs and infestation and killing of standing live Douglas-firs**. To date, no data have been collected from areas where silvicultural practices such as this have been used, and any information gathered will be useful under the principles of adaptive management.

- **If DFB populations are at high levels in the general area because of large amounts of recent blowdown, it would be prudent to postpone felling of CWD trees until populations subsided.** This would be 2 years from the summer in which many discolored trees are present (or 4 years after the first spring following the blowdown), unless there are large amounts of blowdown in subsequent years. If this is the case, one should wait longer. Once the infested trees discolor, the extent and intensity of the previous year's DFB activity can be estimated using the Annual Aerial Insect Detection Survey maps.

- **If possible, fell tree species other than Douglas-fir for** CWD

From: Hostetler, B. and D. Ross. 1996. *Generation of Coarse Woody Debris and Guidelines for Reducing the Risk of Adverse Impacts by Douglas-fir beetle.* Westside Forest Insect and Disease Technical Center. Unpublished.

Appendix C-1: REVIEW SUMMARIES

Environmental Elements Review Summary

The following table summarizes environmental features which the Bureau of Land Management is required by law or policy to consider in all Environmental Documentation (BLM Handbook H-1790-1, Appendix 5: Critical Elements of the Human Environment). Information in the table applies only to the proposed action.

Environmental Feature	Affected/May Be Affected/Not Affected	Remarks
Air Quality	Not Affected	
Areas of Critical Environmental Concern	Not Affected	
Cultural, Historic, Paleontological	Not Affected	Survey not required per protocol approved Aug. 1998 (contract suspends operations if discovery)
Prime or Unique Farm Lands	Not Affected	None present
Invasive, Non-native Species	Not Affected	Does not introduce new or increase spread of existing non-native species
Environmental Justice	Not Affected	No impact anticipated
Flood Plains	Not Affected	No development in flood plains
Native American Religious Concerns	Not Affected	
Threatened, Endangered, or Special Status Plant Species or Habitat	Not Affected	No known sites found. See Vegetation, Special Status/Attention Species, Chapter III

Environmental Feature	Affected/May Be Affected/Not Affected	Remarks
Threatened, Endangered, or Special Status Animal Species or Habitat	Wildlife: May Be Affected Fish: Not Affected	All appropriate mitigation has been incorporated into design features. See Wildlife, Special Status/Attention Species, Chapter III See Fisheries, Section III
Hazardous or Solid Wastes	Not Affected	
Drinking or Ground Water Quality	Not Affected	
Wetlands or Riparian Reserves	Affected	See Riparian, Section III
Wild and Scenic Rivers	Not Affected	
Wilderness	Not Affected	

COMMON ISSUES REVIEW

Resources	Affected/May Be Affected/Not Affected	Remarks
Special Attention Animal Species and Habitat	May Be Affected	All sites found have been protected
Special Attention Plant Species and Habitat	Not affected	Project area surveyed. No sites found.
Minerals	Not affected	
Land Uses	Not affected	
Soils & Sedimentation	Affected	See Soils section.
Water:		
DEQ 303(d) listed streams	Affected	North Fork Asea River, is a 303(d) listed stream from its mouth to its headwaters; project not likely to affect water quality in the river.
Water Temperature	Not affected	
Water Quantity	Not affected	
Rural Interface Areas	Not affected	